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JUNE
1960

Industrial Refrigeration

COVER — An Air Conditioner For Missiles. See page 34

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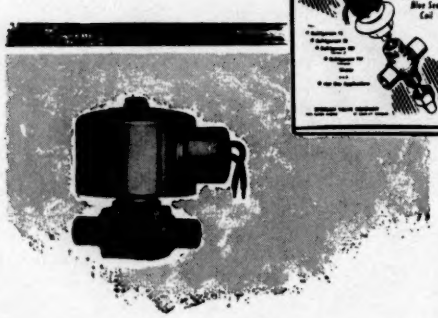

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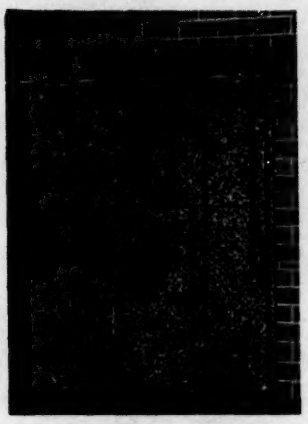

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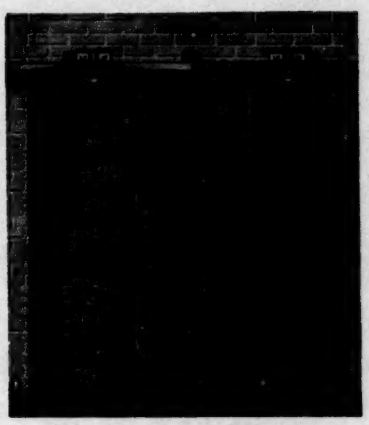

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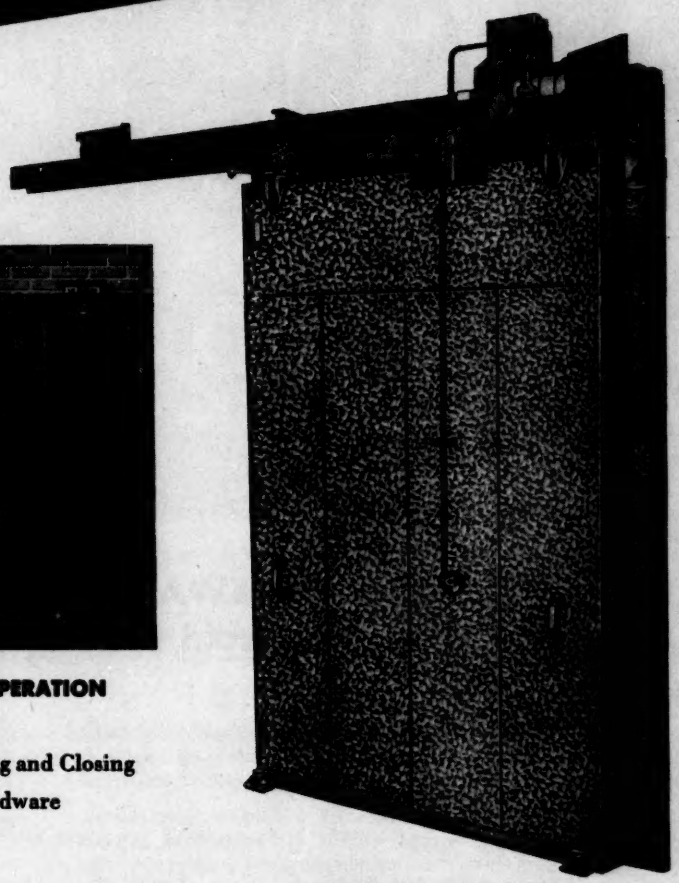

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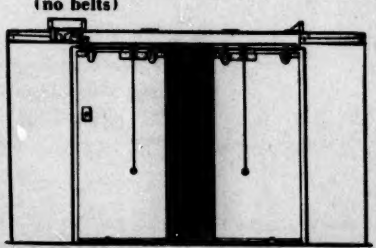

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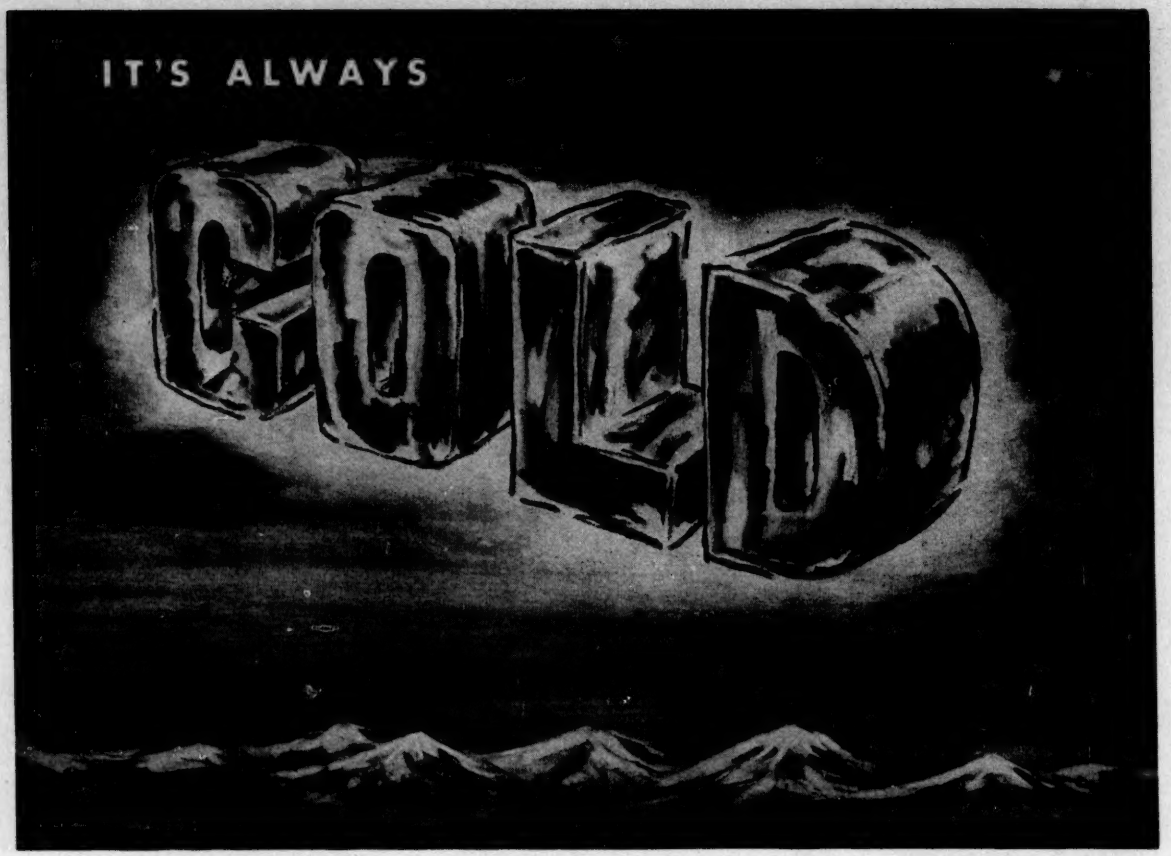

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Industrial Refrigeration

June 1960

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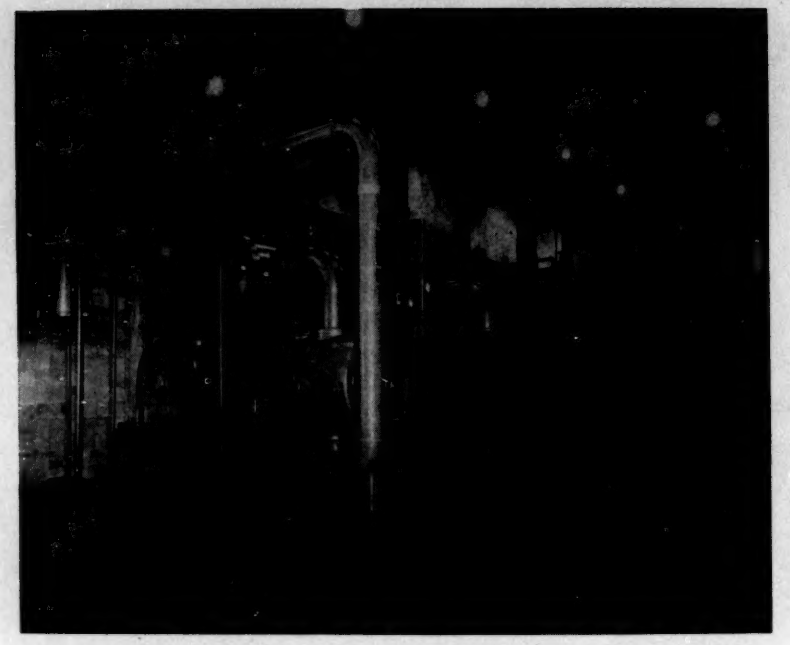
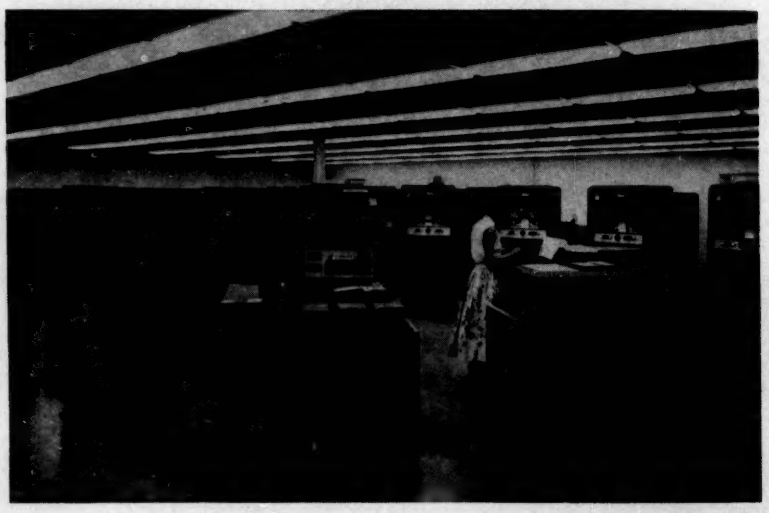


To keep computers happy it is necessary to keep them under air conditioning. Compressor in right foreground of this picture provides refrigerated air for Convair Astronautics computer building at San Diego.

500 Tons of Air Cooling For Computers

Temperamental Machines Suffer Nervous Breakdown If Weather Gets Too Hot

To do their work of solving difficult problems in mathematics, computers demand weather that is just right. When it gets too hot these electronic devices become temperamental and unreliable. This view is of air-conditioned computer room in Convair Astronautics plant at San Diego.



»»» MODERN electronic computers can solve difficult problems in mathematics many times faster than the brightest of human beings when the weather is just right. But when it gets too hot, they can become about as temperamental and unreliable as a prima donna with scarlet fever.

In fact, according to Convair-Astronautics officials at San Diego, Calif., it's possible for a computer to undergo a complete nervous breakdown at temperatures that aren't high enough to bother an average human being.

Consequently, in building their new plant for the manufacture of Atlas missiles, said officials decided to forego the luxury of air conditioning in their own offices in order to obtain an unusually efficient cooling system for their computers —which presently occupy a 60,000 sq. ft. building.

This wasn't strictly a matter of altruism, of course. Prevailing indoor temperatures at San Diego are such that heating is more frequently essential than cooling to human comfort. However, there are some days in midsummer when air conditioning could make life more pleasant in Southern California.

To keep the computers happy, Convair-Astronautics now has a central air conditioning system which is capable of providing up to 500 tons of refrigeration hourly. In this system, air is circulated over a copper coil containing a refrigerated solution of water and ethylene glycol and then ducted directly to the internal and external components of each computer via floor outlets.

Main component of the air conditioning system is a semi-hermetic centrifugal compressor, driven by a 1750-rpm motor located outside of the compressor to minimize operational vibrations and facilitate maintenance. Sized to 200% of system requirements, it uses both electric and pneumatic controls and has accessories for the purpose of providing reasonably dry air.

Galvanized sheet steel ductwork and housings in the system are fiberglass insulated to minimize heat transfer.

Air that becomes warm after leaving the system is exhausted via ceiling vents by electric fans.

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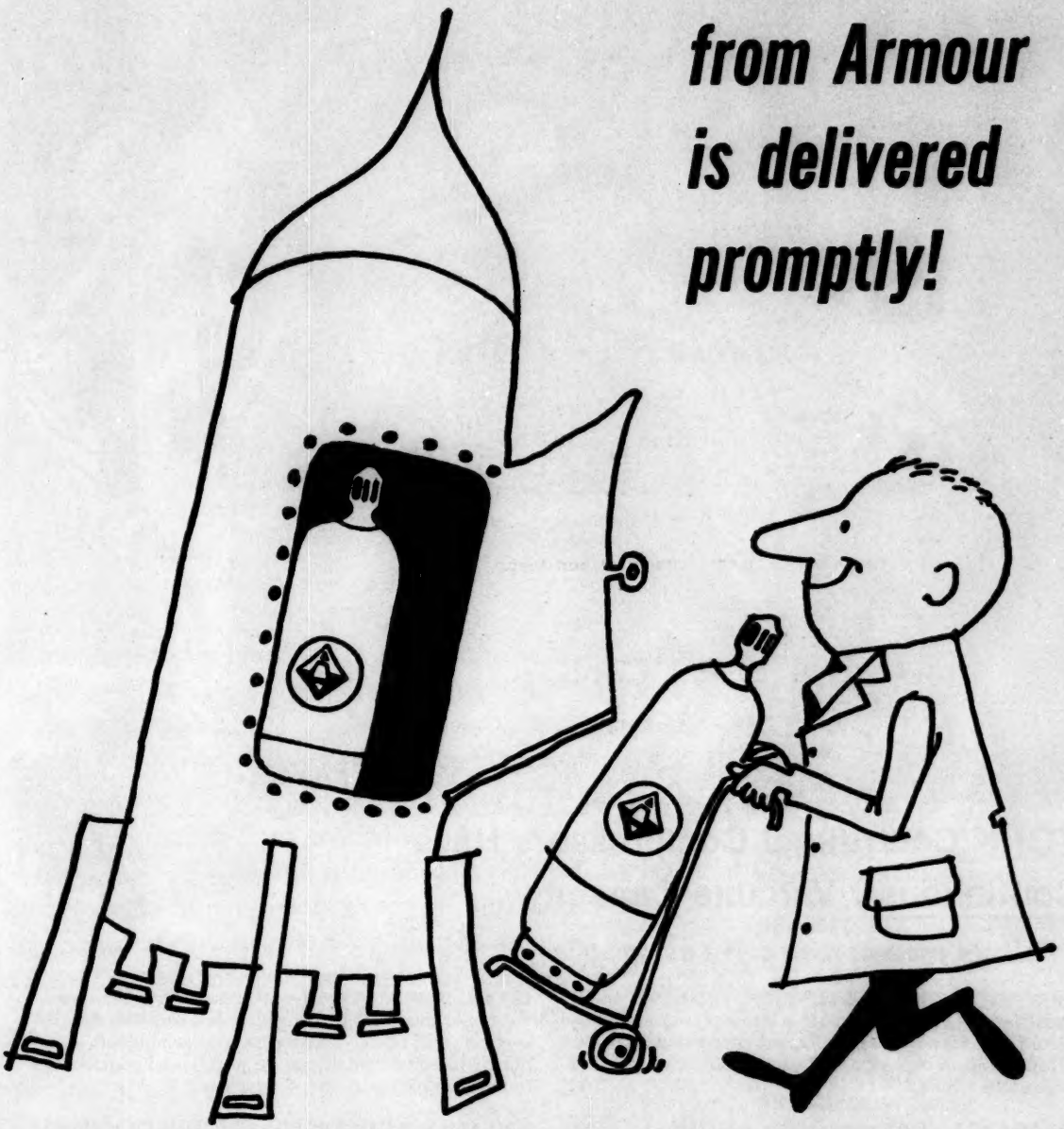

Late deliveries can cause trouble in the form of low head pressures and cooling room shutdowns. To avoid trouble many users resort to stockpiling extra cylinders.

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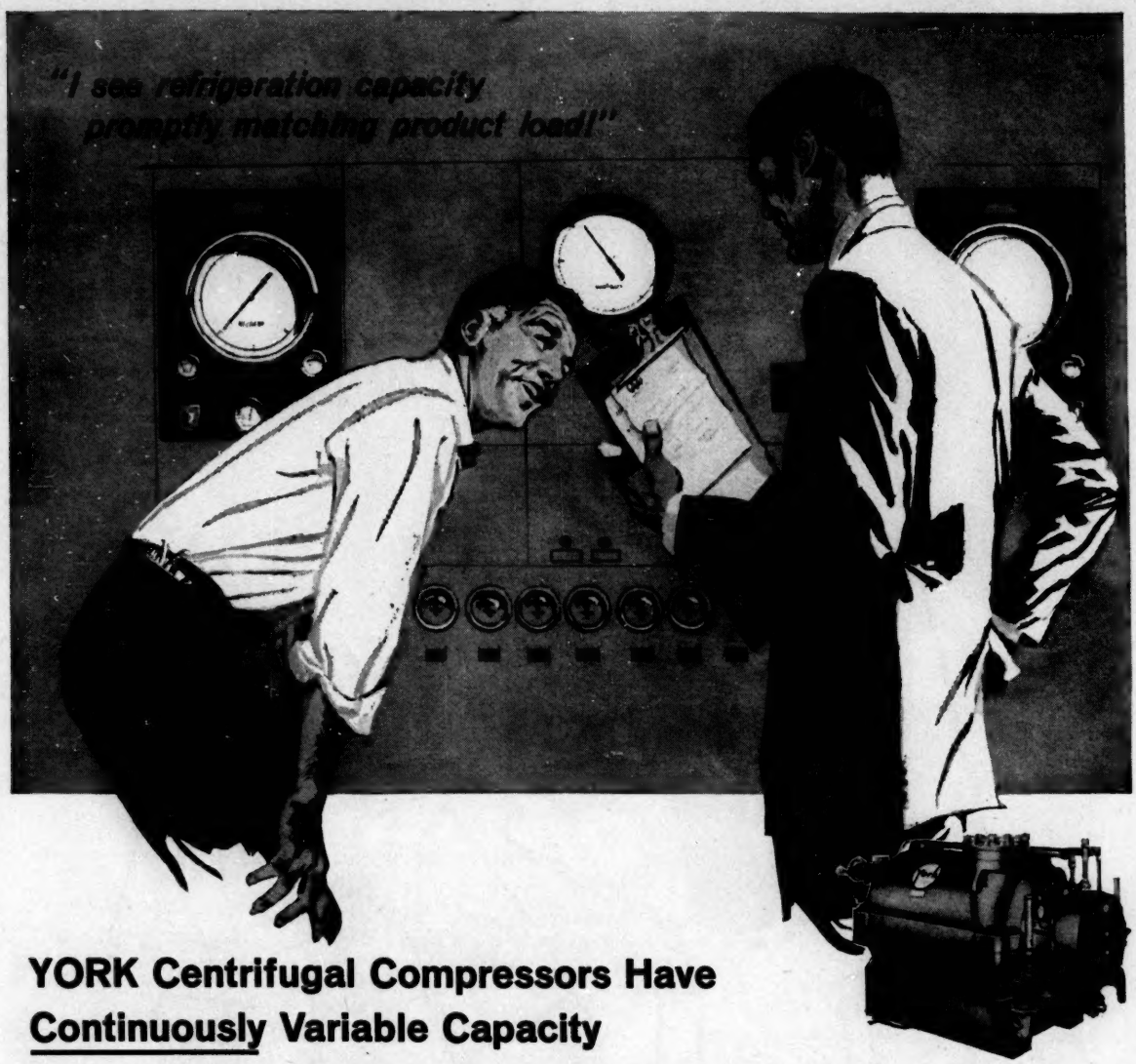

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—Follows product load curve automatically

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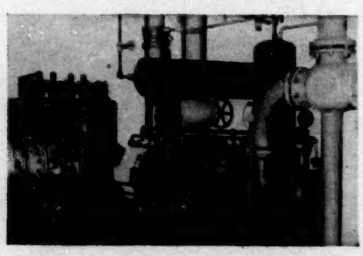
MAINTENANCE REDUCED—Simplified centrifugal design cuts wear. Bearing replacement easily made without removing casing. One unit holds several operations at various temperatures. Well-suited to economical constant speed drive.



Another YORK Trail Blazer Concept Proved In Action at *John Morrell Co., Sioux Falls, S. D.*—York Turbomaster ammonia Compressor delivers 1,000 tons refrigeration at 5°F. Nine stage tandem unit has 1,720 hp turbine drive. Intercooler between casings and interstage injection provides efficient gas cooling.

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WRITE FOR BULLETIN

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47 YEARS OF CONTINUOUS ACHIEVEMENT IN HEAT TRANSFER

news briefs of the month

Expanded Edition of Adsorption Equipment Standards

An expanded edition of Standards Publication for Adsorption Equipment (May 1960) is now available from the Adsorption Section of the National Electrical Manufacturers Association, 155 East 44th Street, New York, N.Y. for 40 cents per copy.

Adsorption equipment, which is growing in use in a wide variety of industries, employs dry desiccant materials for the removal of moisture from air, other gases and organic liquid. The new edition covers definitions, determination of moisture vapor due point in pressure ranges of 0 to 10 psig and 10-500 psig, and procedures for testing solid adsorption-type dehumidifiers in the same two pressure ranges.

Instrument Conference Will Attract 30,000

Arrangements are being completed for one of the largest internationally recognized scientific and industrial events of 1960—the Fall Instrument-Automation Conference and Exhibit of the Instrument Society of America, together with the Society's 15th Annual Meeting. It will be held in New York City during the week September 26 through 30, it is announced by John Johnston, Jr., national president of ISA.

Nearly 30,000 people, including scientists from the Americas and from Europe, are expected in attendance. Close to 400 leading instrument manufacturers will display and demonstrate the newest in scientific equipment at the New York Coliseum. Over 50 technical sessions at the Conference have been scheduled for presentation of almost 200 informative papers and discussions on the latest instrumentation developments and concepts used in most industries and processes.

Investment Booklet On Industrial Air Conditioning

How to determine whether factory air conditioning will be a profitable investment is the subject of a new, easy-to-read booklet entitled "Will Factory Air Conditioning Pay Off For Me?", The booklet presents four key check-figures with which plant executives can qualify their operation. Two or more affirmative answers indicate that air conditioning would not only pay for itself but would return a profit on the investment. The booklet can be obtained by writing Carrier Corporation.

Standard Method For Measuring Cooling Loads of Refrigerated Trailers

A standard method for measuring the cooling loads of refrigerated trailers for rating purposes has been developed at the National Bureau of Standards in a project sponsored by the Truck-Trailer Manufacturers Association (which has adopted this standard method) and two Federal Government agencies. As an important part of the standard procedure adopted, a "heat sink" comparison method is used to compare the heat absorbed in a cooling coil inside the trailer, with the heat absorbed by the circulating brine in an outside heater. The standard rating method will enable trailer manufacturers to publish a rated cooling load for each model, thus aiding purchasers in selecting refrigerating units. Standard methods for rating weight gain and air leakage of trailers also were developed in the program at the Bureau.

New Use For Ice Cubes

Union Oil Of California have found that ice cubes make a good pipe line cleaning agent. Confronted with a cleaning problem they pumped 400 pounds of 4-inch cubes at high velocity through a 3000 foot 10-inch line at the firm's Los Angeles refinery. The frozen cleaner did a very satisfactory job at less cost than chemicals.

Consolidated Increases Refrigerated Fleet

Consolidated Freightways of Menlo Park, California has added 208 new refrigerated trailers to its transportation fleet. This addition materially increases its capacity for transportation of frozen and other perishable food products. "Demand for protective services has been steadily increasing throughout our system" according to the company. "Capacity of our transcontinental fleet is now more than 50 percent greater than last year and we have also increased both the capacity and the flexibility of locally based equipment."

Fig. 1—Completed dam and highway bridge are shown in artist's conception of the scene on completion of work in the mid 'Sixties'. Bridge was built across canyon at outset to save builders 225-mile detour from one rim of canyon to the other (Photo courtesy Fairchild Aerial Surveys, Inc.)

Fig. 2—Looking downstream, aerial photo shows excavation at bottom of canyon. Keyways upstream of bridge mark site of dam. Spillways are immediately upstream of keyways. Crescent object in foreground is log boom to catch floating debris before it enters diversion tunnels.

4000 Ton Plant Cools Concrete

»» A GREAT concrete arch structure 700 feet high, with crest length of 1,550 feet and maximum thickness of 340 feet, at the base, is taking shape in the Colorado River on the Utah-Arizona border. It is the $108 million Glen Canyon dam and power plant. The dam, second only to the Hoover Dam in height, will back up a reservoir of 28 million acre-feet extending up the Colorado a distance of 186 miles and back up the San Juan River tributary 71 miles (see Fig. 5). Integrated will be a 900,000-kilowatt power plant.

Excavation was begun at Glen Canyon in 1957. Placing of the 4.83 million cubic yards of concrete required for the dam and power plant will begin this year (1960) and will require from three to four years for completion.

Everything about this job is big. For instance, a $4 million bridge (Fig. 2) just completed spans the river 800 feet downstream of the damsite. It was built to help the construction crew build the dam. Without it, the trip from one rim of the canyon to the other entailed a 225-mile detour. In addition, 25 miles of access roads have been built.

Big as it is, Glen Canyon is part of an even bigger project, the $760 million Colorado River Storage Project. Its big mainstream dams, 11 irrigation units, and power output will serve 3 million people in Colorado, Wyoming, New Mexico and Utah.

Concrete Is Placed Cold

Concrete for the Glen Canyon Dam will be placed cold, and its temperature after placement will be lowered by operation of an imbedded pipe cooling system. There are two reasons for refrigeration:

1. To reduce temperature gradient within the big blocks of concrete, between interior and surface, in order to prevent cracking.

2. To accelerate contraction of the blocks to minimum size in order to open joints between adjacent blocks sufficiently for grouting.

The deep interior of big blocks is very little affected by fluctuations in the ambient temperature, even by very abrupt changes of large amplitude. But diurnal and annual variations are fully absorbed by surface areas exposed to direct sunlight and direct contact with the ambient air or water. Without refrigeration, the stresses imposed by the interior-exterior differential in rates of contraction and expansion are excessive and would cause cracking.

Without refrigeration, the heat of hydration within very large blocks such as those to be placed in Glen Canyon (of the order of 60 x 200 feet) would not be entirely dissipated for at least 10 and possibly as long as 50 years. Grouting of the joints between adjacent blocks must be deferred until joints have opened as far as they ever will; that is, until the

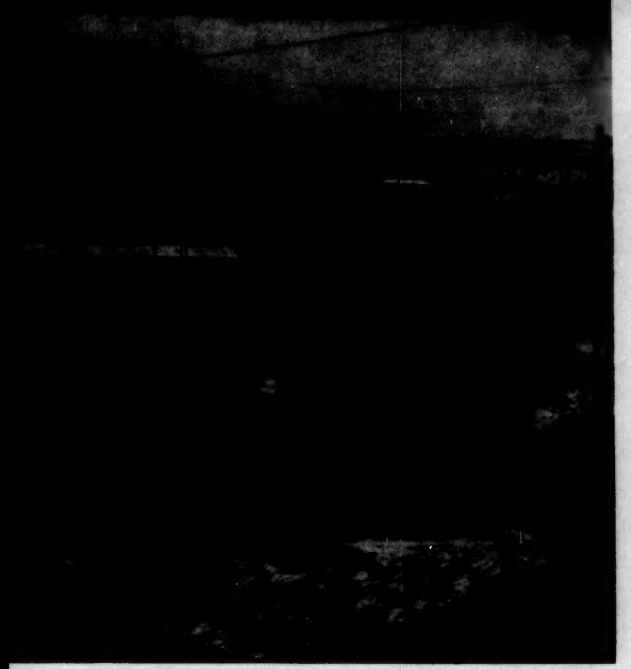


Fig. 3—Refrigeration plant is the long, low building at middle altitude in picture. Cooling tower and silos for storage of cement and pozzolana are at greater elevation. Batch plant below provides downhill movement of materials. (Photo courtesy U. S. Bureau of Reclamation.)

Concrete is refrigerated for two reasons. One is to reduce temperature gradients between surface areas and the interior, thus preventing excessive stresses that would cause cracking. The second reason is to accelerate the process of contraction so as to open the joints between adjacent blocks of concrete sufficiently for grouting. For structures of the magnitude of the $108 million Glen Canyon Dam and the integrated 900,000-kilowatt power plant, as long as 50 years might be required for dissipation of the heat of hydration from the massive concrete blocks. For this reason, a 4,000-ton refrigeration plant has been set up at the damsite to cool 4,830,000 cubic yards of concrete to be placed at not more than 50°F.

For Glen Canyon Dam

concrete blocks have contracted to minimum size.

Refrigeration removes in one or two months the heat that would otherwise require as long as 50 years to be dissipated. The concrete is cooled to grouting temperature, and then the cement grout is pumped into the joints.

Accordingly, a 4,000-ton refrigeration plant was designed by Lewis Refrigeration Co., Seattle (Wash.) refrigeration contractors. This plant was installed (Fig. 4) by Merritt-Chapman & Scott Corporation, general contractors for the U. S. Bureau of Reclamation project. The plant keeps the mix in the 40° to 50°F range during placement and supplies coolant to blocks of mass concrete. It produces 35°F water for cooling the aggregate, makes 425 tons of ice per day, cools air for circulation through the aggregate bins, and prepares a coolant that is circulated through coils to hold down temperature of the emplaced concrete.

Most of the ice produced at this plant is consumed in use as an additive in the mixing water. Some of the concrete emplaced at 50°F is further cooled to 40°F after emplacement.

Horsepower Used Efficiently

In an operation of this scope, the efficient use of horsepower and durability and dependability of refrigeration equipment assumed extraordinary importance. Since the equipment was to be in heavy-duty operation over a period of several years, and because failure could throw enormous coordinated operations out of phase, power economy and reliability of the system were optimized.

Four No. A-175 FES-Fuller Rotary Booster Compressors, each driven by 125-hp motors and having 150-ton capacity, were supplied by Lewis Refrigeration Co. as second stage to bring capacity up to the rated 4,000 tons pumping from 5 psig to 45 psig. For maximum production in relation to a given refrigeration horsepower, ammonia is employed in the compressor.

These units provide particularly efficient compression of large gas volumes. Eccentric mounting of the rotor in the cylinder forms a crescent-shaped gas space divided into several small compartments. The heat-treated plastic blades slide radially in the rotor slots and are forced out solely by centrifugal force. Pressure difference between compartments is small, providing high volumetric efficiency and minimum wear. Absence of reciprocating motion eliminates vibration and gas pulsation.

Beveled leading edges of the blades maintain an oil film with cylinder walls. The cylinder bottom is machined to the rotor diameter to make a broad sealing surface between inlet and outlet.

The oil-flooded double rotary shaft seal prevents refrigerant leakage or air infiltration. Seal chamber is filled with oil and equalized

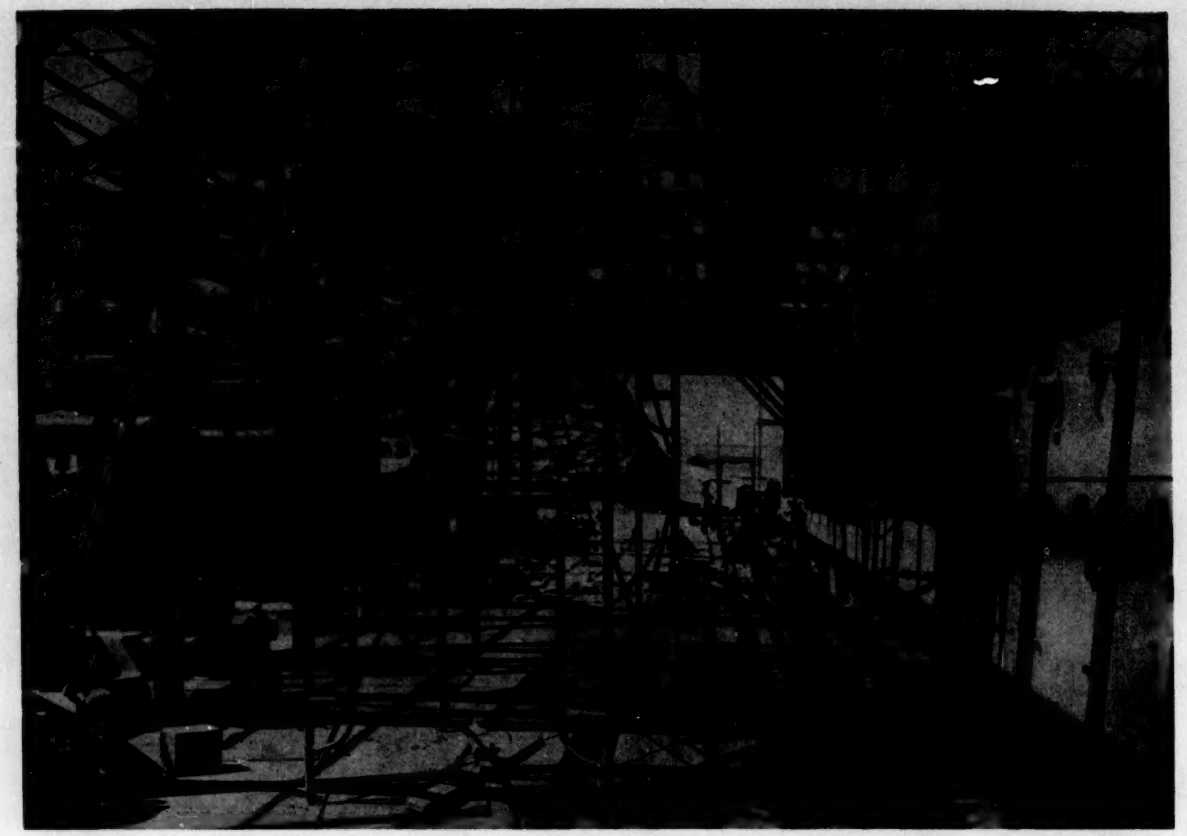


Fig. 4—Interior view of compressor room of ice plant is shown during construction. (Courtesy U. S. Bureau of Reclamation.)

to the compressor discharge through a two-way check valve in order to maintain atmospheric or positive pressure at all times.

How Raw Materials Are Massed

Water for both the mix and the refrigeration plant is collected from several wells near the aggregate production plant, which is about five miles from the damsite, and transported in a 20-inch steel main to the refrigeration and mixing plants.

Construction equipment and materials are trucked in from rail heads at Flagstaff, Ariz., Clarkdale, Ariz., and Marysvale, Utah (see map, Fig. 5).

Six types of aggregate are produced at the heavy-media aggregate plant. This material is carried by trailer trucks to a drive-over surge hopper at the damsite, where it is bottom-dumped, then borne 384 feet along a conveyor inclined upward 17 degrees to a steel trestle 90 feet high and 900 feet long. A shuttle conveyor carries the material out along the trestle and deposits it in six stockpiles, one for each different type of aggregate.

Two types of sand are delivered to a hopper from which they are distributed to their respective stockpiles by a radial stacker.

Air-operated clam gates, remotely controlled, draw material from the eight stockpiles into a 1,300-foot recovery tunnel, 8½ feet high. A 36-inch conveyor carries the material in the tunnel out about 500 feet beyond the mouth of the tunnel, where the aggregate receives its first chilling with ice water.

Aggregate Dewatered And Stored

Coarse aggregates are dewatered. Fines are then drawn off through a 6 x 14-foot rescreen atop the 217-foot-high batch plant and the rest of the material distributed among eight compartments, four of which store the four sizes of screened gravel, ranging from 6-inch to No. 4. Two others are used to store the two sizes of gravel processed through the heavy-media plant, and the remaining two receive the two types of sand.

Total capacity for aggregate storage at this stage is 3,000 tons.

Cement, trucked in from Clarkdale, and pozzolana from Cameron, Ariz., are dumped onto drive-over receiving hoppers, then moved by Fuller-Huron Airslide* fluidizing conveyors and bucket elevators to seven storage silos, three of which are charged with pozzolana, the rest charged with cement. Capacity of each of these silos is 10,000 barrels.

Fourteen-inch reclaiming screws feed material from these silos to twin 12-inch Airslide conveyors, which carry it to two 700-barrel silos at the concrete plant. From these, material is screw fed to individual weigh hoppers that automatically deliver the proper proportions of each type into process.

**Trademark of Fuller Co., Catasauqua, Pa.*

All Materials Feed Downgrade

The big batch plant has been set up on an almost inaccessible bench cut into the canyon wall 280 feet below the level of the canyon rim, on which the concrete silos stand (see Fig. 3). Thus all cement and aggregate is fed downgrade to the batch plant.

At the batch plant, proportioned materials are fed into a collection hopper, from which they are then fed by swivel chute, alternately, to six four-yard mixers. This completely automatic batch equipment can mix up to 480 cubic yards of concrete per hour.

A batch includes a metered quantity of shaved ice brought in by conveyor from the refrigeration plant atop the canyon via an insuated hopper, from which it has been fed by screw conveyor to the batch hopper and then into the collection hopper.

Push Button Chooses Formulas

Any of 12 different formulas may be automatically delivered into the collection hopper, the operator having only to push a button in order to program the desired formula.

Mixers can be used to mix and store as many as three different types of concrete at the same time. The mix is discharged into a partitioned wet-batch hopper with total capacity for 65 cubic yards of material.

The wet-batch hopper discharges the concrete to dump cars, each having 12-cubic-yard capacity, and these cars transport the material by rail out over a trestle running across the dam's right keyway. The cars dump it into buckets, each having 12-cubic-yards capacity.

The buckets shuttle along two 50-ton cableways, each of which covers the entire dam and power house site, placing the concrete.

Excavation begun here in 1957 is expected to lead to the production of electric power in the middle 'Sixties (see Fig. 1 showing completed project). Taken altogether, the huge Colorado River Storage Project will bring abundant power and irrigation . . . and with these, industry, people, and homes . . . to a big area of the country that today is, to a great extent, arid and unpeopled.

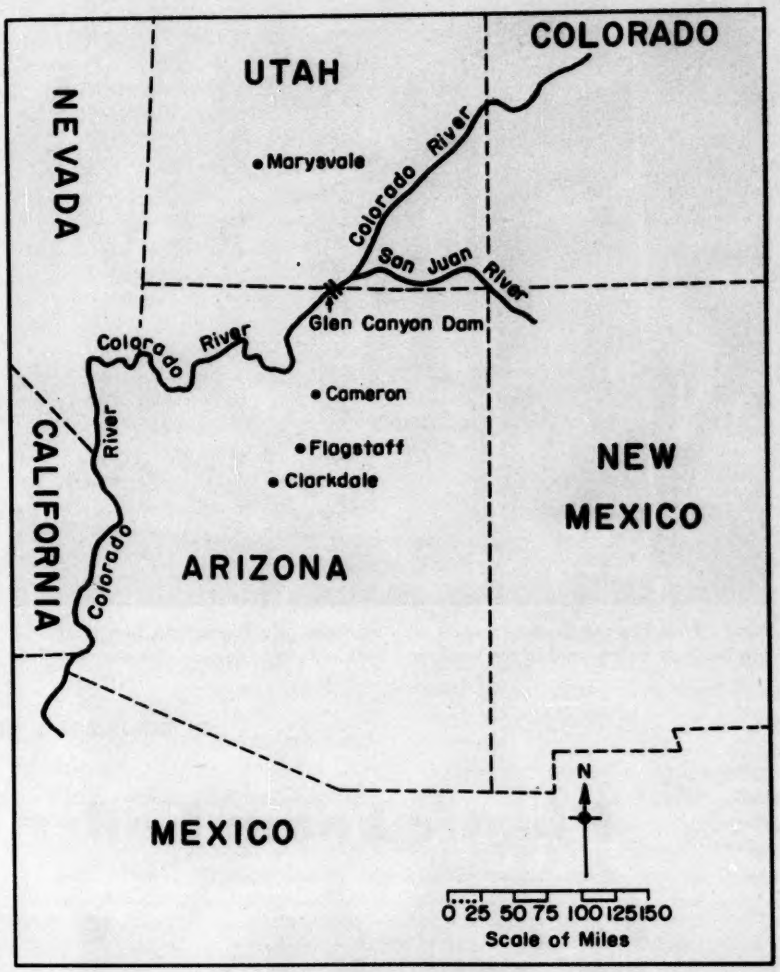


Fig. 5—Map suggests magnitude of the Glen Canyon Dam Project. Note location of communities from which supplies and materials must be brought up from rail heads.

MARINE AIR CONDITIONING DEVELOPMENT MAKES DUCT WORK EASY

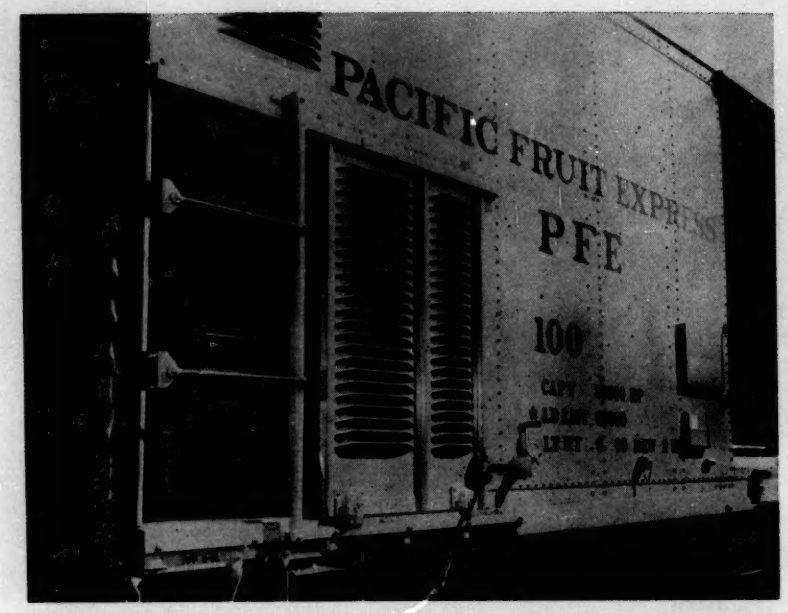
»» A NEW development in marine air conditioning designed to reduce installation costs and simplify servicing has been introduced. The new technique employs spirally-wound air ducts supplied in 12 foot lengths. These are connected into an air conditioning network throughout the ship by factory fabricated couplings and fittings, and in a few cases by means of flexible, stainless steel quick couplers. The cylindrical duct is cut to length on the ship as required.

Obstructions such as pipes in the way of duct lines no longer stop work until drawings are consulted and possibly new layouts made. Short duct lengths connected by the new flexible couplings quickly form the brief detour.

The first major installation using this new duct system will be made aboard nine 11,000-ton cargoliners to be put into service next year by Lykes Bros. Steamship Co., Inc. of New Orleans.

The new Lykes vessels are the first of 53 passenger-freighters which Lykes plans to order for its world-wide operations. The ships were developed for Lykes by Gibbs & Cox, naval architects and marine engineers.

Continued on page 16



Pacific Fruit Express Cars equipped with mechanical refrigeration (left in photo) are the type being used in the insulating tests with foam-in-place plastic material.

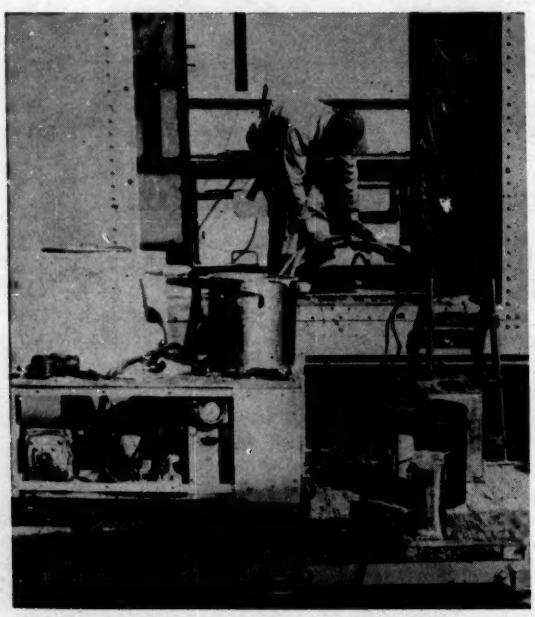
Plastic Foam Under Test By Pacific

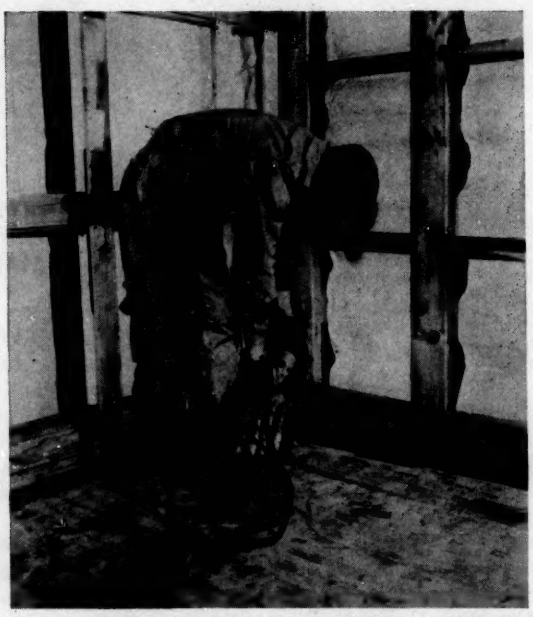
By BENJAMIN S. COLLINS, Nopco Chemical Company

»» PACIFIC Fruit Express Company, jointly owned subsidiary of the Southern Pacific and Union Pacific railroads, is seeking a moisture-resistant, permanent insulation-barrier material that, built into new cars, will perform indefinitely with maximum efficiency. Being tested at present is Nopco Lockfoam, a polyurethane material made by the Plastics Division of the Nopco Chemical Company that can be foamed in place.

The ability of Lockfoam to provide voidless filling in any structural cavity means that its use in reefer car walls, floors, panels and ceilings will minimize moisture accumulation and migration, corrosion of interior members, rust formation, and heat leakage.

At the present time, Pacific Fruit has one 40-foot reefer in service insulated with a complete Lockfoam envelope. Twenty-six additional





The foaming operation is undertaken by two men. With a reservoir of resin and catalyst convenient to the area (top photo) the workmen feed their hoses out to points of pour—one-inch holes drilled in floor deckings (photo at right). The foam is poured in place through these holes, into the interior, by means of a metering nozzle which combines urethane resin and catalyst in correct proportions. Pouring is done consecutively, the workmen moving from boring to boring, emitting a specified fluid amount into each opening. A complete floor in a car can be foamed in 15 minutes. The foam equipment (shown in the two photos) is a Nopcometer, which the Nopco Chemical Company leases to customers.

cars with floors of Lockfoam are also in service as part of the long-range testing program.

Pacific Fruit Express is the world's largest company of its type. Founded jointly by the two major railroads in 1906, it began operations in 1907. It has been handling over 340,000 carloads of perishables per year and, in the past decade, has been prime mover of one-third of the perishables transported by rail in the United States.

The principal source of Pacific Fruit business is the varied and volume-producing growing areas of the far west. The company carries anything requiring protective service, from bees and rose bushes to frozen foods, fish, meat and all types of fresh produce and fruits.

Since PFE handles all perishable traffic originating on and moving over Union Pacific and Southern Pacific lines, the size of its refrig-

Fruit Express

eration job is enormous. The company builds its own equipment and undertakes repairs in its own shops spread from Tucson, Arizona, and Los Angeles, California, to Nampa, Idaho.

From the beginning, ice has been the principal means of refrigerating perishables moving by rail. It still remains so today. But trends toward increased frozen foods packaging and retailing of everything from soup concentrates to full-course dinners, have prompted changes in handling.

PFE's current emphasis in all new car construction is on mechanical refrigeration. Diesel-powered systems capable of providing a controlled range of temperatures between zero and 70 degrees Fahrenheit give much more precise results and are expected to prove cheaper to operate.

In 1953 Pacific Fruit began a program of new construction on mechanically refrigerated cars at its Los Angeles shops. This has involved expenditures of some 35 million dollars. The program was completed last February. The program is the start of an eventually complete conversion of PFE equipment to mechanical refrigeration. Now, PFE has 1712 mechanical cars in operation, out of some 31,000 in service. It leads the industry in this change-over process.

A world leader in the handling of perishables, PFE built two objectives into its program—development of a high performance car which would allow better temperature control, and development of insulators which would outperform and outlast existing materials.

Much progress has been made in developing an efficient mechanical refrigeration plant and like developments in car construction and insulation are taking place to keep pace with these mechanical developments.

Nopco engineers, working out of both the West Coast plant at Los Angeles, California, and the home plant, North Arlington, N. J., sought the answer to several insulation problems.

Their preliminary investigations showed that foam-in-place urethane plastic, would provide a voidless fill and adhere, permanently, to all barrier wall surfaces between which it was poured. This characteristic should mean that, once in place, no amount of jolting will cause it to shift, creep or move.

Another advantage apparent when test foaming of several cars was tried, is the fact that labor costs can apparently be reduced. By using Lockfoam, the user can achieve comparable results in a third of the installation time and appreciably lessen the volume of material in handling and storage.

Pacific Fruit and Nopco have been working together over three years toward the development of the application of foam insulations. Nopco undertook its first test in the summer of 1956 at PFE's Roseville shop. Foam was poured through borings into the floor of a 40-foot reefer car. A 2½ pound density, semi-rigid foam was used and it was poured with the first metering equipment the plastics industry had to offer.

Results by today's standards were poor. The K Factor was high—K Factor being an expression of a material's tendency to conduct heat—and such other properties as flowability, water pickup and cell structure were also below desired specifications.

Nopco engineers went back to the laboratory, in both Los Angeles and North Arlington. A year and one-half later, they poured a second floor, using a two-pound foam and greatly improved metering equipment. Results were better, but the K Factor was still between .24 and .26.

In addition, the costs per pound for the foam remained high, Pacific Fruit suggested Nopco endeavor to develop a foam with pound and one-half density, which would have all the necessary characteristics and also be economically practical.

Meanwhile, PFE inspectors ripped up the decking in the second car poured and examined the foam blanket. The foam was voidlessly intact and completely dry even though water hoses had been used regularly to clean the car's interior.

Late last year, Nopco engineers revisited PFE's Los Angeles shops where the car building program was in full swing. With them, the development team had their answer to the foam formulation sought for so long. It has a density of 1½ pounds per cubic foot and is semi-rigid. Nopco technicians developed the foam using Refrigerant 12 additives, employing the gas as a blowing agent instead of carbon dioxide. This has greatly increased the foam's thermal qualities.

This new material has been poured into several cars. It is claimed the system now employed has a K Factor of between 0.11 and 0.16. A "K Factor" in this range is extremely low.

The next step was to work out refinements in the procedure for foaming. This has been done and, so efficient is the one in effect today, that an entire car can be foamed in two to three hours and an entire floor can be completed in 15 minutes.

Pacific Fruit, in its experimental cars, did its foaming in continuous pours. The steel cars were completely built except for a final roof assembly. Floors were foamed first. A number of one-inch holes were drilled in the wood decking, spaced three feet apart. These holes were

located so that all voids between floor stringers could be reached. In addition, three-eight inch holes were also drilled in decking to prevent air locks and occlusions as the expanding foam boiled to a complete fill.

Pouring was accomplished by means of a metering nozzle attached to lengths of hose carrying the isocyanate resin and catalyst. The nozzle was inserted through the holes and a predetermined amount of foam fed in. The workman then progressed easily to subsequent pour points.

All of the cars foamed to date have been 40-footers with a cubical capacity of 2384 cubic feet and weight capacity of 40 tons. It is estimated that 820 cubic feet—approximately 1315 pounds—of Lockfoam is needed to completely foam a 40-foot car.

In place, foam insulation in floors and walls is six inches thick. Roofs take a foam barrier eight inches thick. One hundred sixty-seven cubic feet of Lockfoam go into car floors; side walls require 175, end panels 40, and roofs 236 cubic feet.

The pouring of sides and end walls in the single car so far foamed was done through one-inch holes drilled in the sub-lining below the car's interior belt rails. It is believed, however, that future pouring can be accomplished in these vertical locations from the top of the walls, and that results, despite the height of rise, will be equally as homogenous.

THEME OF 22ND DAIRY INDUSTRIES EXPOSITION, OCTOBER 31-NOVEMBER 5, IN CHICAGO

»» SHOWCASE 60—Products—Methods—Profits will be the theme of the 22nd Dairy Industries Exposition, October 31-November 5, 1960, in the International Amphitheatre, Chicago, Illinois.

Announcement of the theme was made by R. O. Davison, Kelco Company, president of the biennial Exposition's sponsoring organization, Dairy Industries Supply Association.

In this first "Big Show" of dairy industrial supplies and equipment of the new decade some 400 companies will present displays in the gigantic "showcase" of International Amphitheatre—largest exhibit hall ever made available to the Exposition.

Arrayed for inspection by an expected 25,000 dairy industry men and women will be—

—Products, new and dynamic, of every description, for every dairy industrial need—flavorings, pasteurizers, cleansers, storage and refrigeration equipment, sanitizers, containers of glass, paper, plastic, metal, wood and fibre, packaging equipment, homogenizers, evaporators, churns, freezers, and all other processing machinery, delivery and other distributive equipment, point-of-sale materials, farm milk tanks —all these among a myriad necessary "tools and ingredients" for operation of the most technically complex of the modern food industries—the dairy industries.

—Methods, tested, proved, progress-gauged for ever better handling, processing and merchandising of milk and milk's products in their many nutritious forms.

—Profits, tangible and intangible, accruing directly to the dairy processor for whom the Show is opportunity unmatched for meeting the growth needs of his individual plant; indirectly to the consumer for whom dairy products are, ever increasingly, the best bargain in health-giving food.

In conjunction with the Exposition, eight national and international dairy industry organizations have scheduled meetings in Chicago. Between October 27 and November 4, annual conventions or other gatherings will occur of Dairy Society International, Dairy Suppliers' Foundation, Evaporated Milk Association, International Association of Ice Cream Manufacturers, International Association of Milk and Food Sanitarians, Milk Industry Foundation, National Association of Retail Ice Cream Manufacturers, and National Ice Cream Mix Association.

Admission to the Exposition is free of charge for all dairy processors, dairy manufacturing educators and students, public health officials and sanitarians. The general public is not admitted.

Marine Air Conditioning

Continued from page 13

"There was less than seven feet of scrap duct left after the installation was completed", according to the manufacturer of the duct, the spiral conduit made from coiled steel strip in sizes from three to 24 inches in diameter, is used to distribute conditioned air at high velocity throughout the ship. The flexible couplings also permit removal of duct sections for inspection or replacement in a fraction of the time formerly required.

The spiral seam formed in manufacturing the cylindrical ducts gives added strength to the lightweight copper bearing steel strip. Air loss is prevented by tightening a single nut and bolt which draws the retainer band snugly around the joints.

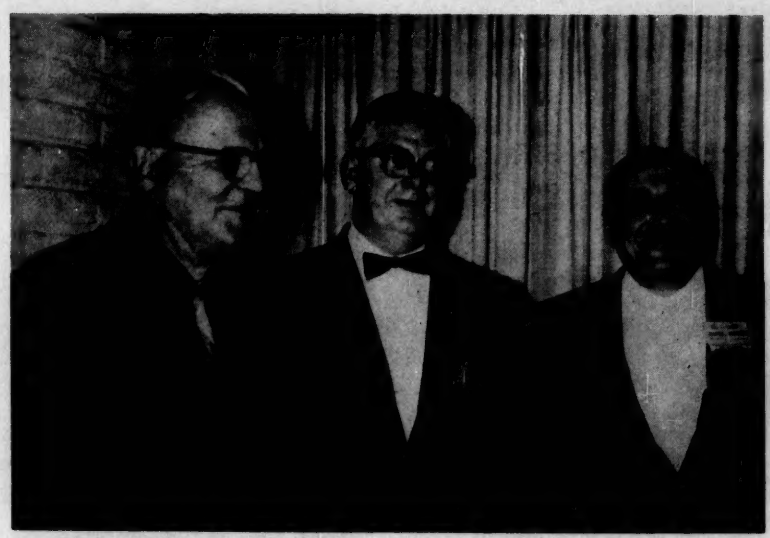
Six reciprocating refrigerating machines will be installed in each of the vessels for Lykes. Two units will air condition passenger staterooms and crews quarters. Four will serve 16,000 cubic feet of refrigerated cargo space and 4,000 cubic feet devoted to ships' stores.

The S. S. James Lykes has just been completed. S. S. Joseph Lykes and the S. S. Zoella Lykes, two other of five cargoliners being built by Ingalls Shipbuilding Corporation at Pascagoula, Miss., are at the pier for fitting out. Four other similar vessels are being built for Lykes by Bethlehem Shipbuilding Corporation, Sparrows Point, Md.

Hot Paint

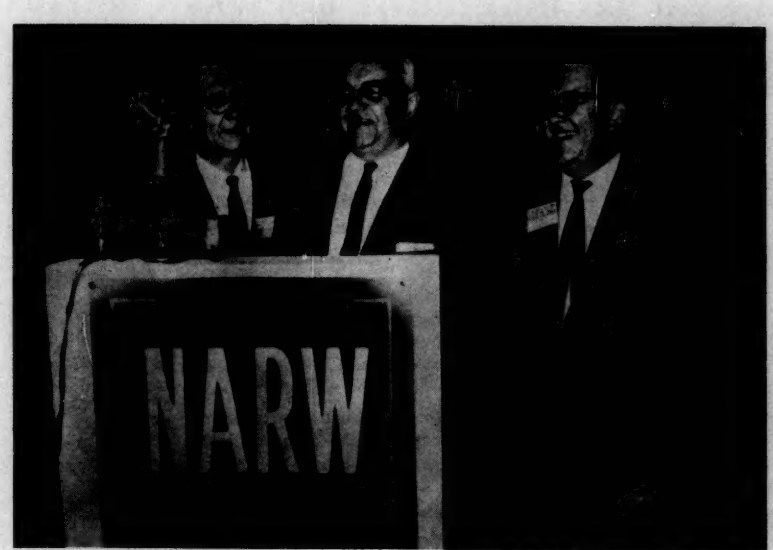
AVAILABILITY of Heat-Rem H-170 in 18 high heat resisting colors that can be applied on surfaces previously regarded as "too hot to paint" is announced by Speco, Inc. This is said to be the widest range of extra high heat colors ever offered by a manufacturer.

The new coatings, depending on the shade used, are reputed to permit color coding or complete finishing of metal components subjected to temperatures from 600° to as high as 1700°. Typical applications include heat transmission lines, traps, stacks, vents, condensers, compressors, ovens, engine heads, etc.



New NARW officers (l. to r.) President, A. R. Carstensen, Crystal Ice and Cold Storage Co., Sacramento, Calif.; Vice-president, Garth A. Shoemaker, Hygeia Refrigerating Co., Elmira, N. Y.; Treasurer William L. Baker, Seattle Ice & Cold Storage Co., Seattle, Wash.

"FORWARD LOOK" IS THEME of Refrigerated Warehousing Convention



Millard W. Young, California (center), President of the Refrigeration Research Foundation, president at the joint TRRF-NARW session. Dr. W. A. Maclinn, Director of the Foundation, is pictured at right. Dr. J. G. Woodruff, (left), Food Technologist, University of Georgia.

National Association of Refrigerated Warehouses Meeting Examines Ways To Improve Customer Service and Diversify Operations

»» MEMBERS of the National Association of Refrigerated Warehouses meeting as a division of the 69th annual convention of the American Warehousemen's Association, covered a number of topics of interest to the industry during the three days of business sessions at the Americana Hotel, Miami Beach, April 25-28.

The AFDOUS Code (Association of Food and Drug Officials of the United States) had been thoroughly studied by the association, and a report of questions and answers was presented by committee chairman Paul D. Burrill, Quincy Market Cold Storage & Warehouse Co., Boston, Mass. In his opinion, the speaker stated, it was the intent of the Code to assist industry through cooperative and voluntary action to improve its handling of frozen foods.

The NARW's position was stated by the speaker as follows: "We are for improved frozen food quality, but believe the Code in its present form is impractical. We recommend delay in adoption until industries affected can study and make recommendations. In the event this cannot be done, we have a revised warehouse code prepared, have set up state chairmen in all states, and have prepared material outlining our stand and recommendations to delay regulations, or if regulation is inevitable to give a guide to make it more practicable."

Distributor Storage

The manner in which the refrigerated warehousemen are being affected by the rapid growth of the frozen food industry was discussed by a warehouseman who has gone into the refrigerated warehouse business.

W. C. Baker, retiring president of NARW, told why his company, Produce Terminal Cold Storage Company, Chicago, has included distribution in their warehouse operation.

Mr. Baker said "because of the increasing number of retail outlets and processors now having their own storage facilities, many warehousemen have an ever increasing surplus of space. Seasonal items are now much less seasonal. For example, turkey processors now own and operate their own blast freezers on a year-round basis."

Citing the decline in the amount of merchandise stored for speculative gains, Mr. Baker said "In the future warehousemen must find other uses for their assets. Frozen food distributors have new outlets to sell, and our industry is in the process of diversification from long-term storage to distributor storage."

Mr. Baker pointed to the number of warehousemen who now operate trucking companies, distributorships, and other subsidiaries as a means of tying-in increased revenue for the warehouse. He said that his own firm operates two distributor subsidiaries which are doing a volume of 15 million dollars this year. He also suggested that warehousemen provide additional services, such as breakup rooms and packaging facilities.

Mr. Baker added that his firm has been successful in using a semi-palletized operation in their multi-level building despite popular opinion to the effect that pallets can be used only in single story buildings.

Dick Page, president of Farrell Foods, New Orleans, and past president of the National Distributor's Association, explained how his company got into the warehouse business. "In the past 13 years", said Mr. Page, "the frozen foods industry has seen a growth equal to that of other food industries since the turn of the century. We have just scratched the surface with the 5 per cent of grocery volume now attributed to frozen foods. This figure is expected to reach 20 per cent, and the phenomenal growth is already bringing violent changes to the industry."

According to Mr. Page, "Distributors were drastically affected in 1951 when packers decided to sell direct to chains. This took the volume out of the distribution business and, as distributors, we had a choice of spending and expanding or pulling back and staying small."

Mr. Page went on to say that due to lack of warehouse facilities in his area, his firm built their own warehouse in 1955. "Some warehousemen try to meet the needs of distributors and others dodge them", he said.

Mr. Page said that distributors need warehouse services tailor-made to meet their customer requirements. "These include break-up rooms, delivery service, special clerical help and longer hours", he said. "People eat on Saturday and Sunday, and the food business expects to be served then. However, the distributor operating on a one to two per cent profit cannot pay high storage charges."

In summing up results of experiences had by his company in the warehousing and distribution business, Mr. Page said that the two

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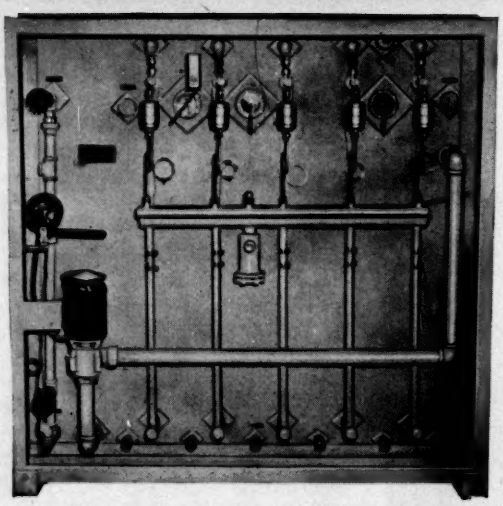

Front View of PURE WATER COOLER (P.W.C.) installed at Salerno-Megowen's large new baking plant at Niles, Illinois.

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Provides a Clear Odorless, Palatable, Cold Water Supply

Equipped with self-contained activated carbon filter, which removes silt, algae and chlorine from city or well water supply. Cools water to 34 degrees Fahrenheit. Pure water is chilled by ice water - prevents freeze-ups. The ideal water for food processing needs, butter or cheese wash, dough water, poultry or produce chilling. or any application where good, cold, clean water is required. Can be connected to present refrigerating machines using ammonia, freon, or methyl-chloride.

The Ice Builder side of the unit may be connected to secondary equipment designed for ice water cooling such as milk coolers, tanks, dough mixers, or air conditioning equipment.

Write for Bulletin PWC 59.

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Manufacturers of Ice Builders - Ice Builder Cabinets - Ice Banks - Pure Water Coolers

Richard M. Powell (left) Executive Vice-president NARW, Washington, and retiring President W. C. Baker, Chicago, discuss the AFDOUS Code during Miami Beach convention.

phases of the business should be operated separately, but should be in the same building in order to cut out extra hauling.

Both Mr. Baker and Mr. Page mentioned some of the obstacles encountered in introducing automation to frozen food storage. Mr. Page said that the ever-changing brands, styles and sizes of packages, as well as less than case orders, offset many of the advantages of automation. Mr. Baker advised a careful consideration of the cost and depreciation of automatic equipment as compared to the savings in labor cost.

NARW-TRRF Joint Meeting

At a joint session of the NARW and The Refrigeration Research Foundation, TRRF President M. W. Young introduced Director Dr. Walter A. Maclinn, who outlined the services which the Foundation has available to help the warehousemen prevent and settle claims for damaged merchandise. He told how their laboratory can analyze products which have been subjected to unusual temperature changes and determine whether or not they have been damaged. He also told how tests sometimes showed that damages becoming apparent during storage could often be traced and attributed to something that had happened to the merchandise prior to receipt by the warehouseman. The Foundation also aids warehousemen with specific directions on best storage methods for dozens of items ranging from asparagus roots to tennis balls. The Foundation staff is also able to prevent damage by advising warehousemen regarding the probability of damage by storing mixed merchandise, some items of which may give off volatile gases which would damage others.

During this session, another speaker, Dr. J. G. Woodruff, Food Technologist, University of Georgia, pointed to some of the advantages of refrigeration as compared to other means of food preservation.

Dr. Woodruff said "Numerous other methods of food preservatives, such as antibiotics, gases, X-rays, ultra violet rays and irradiation, have been lived down and fallen by the wayside in favor of refrigeration. Refrigeration has a marvelous record but many of its qualities have been neglected in the field of industry promotion or public relations.

"Refrigeration uses no additives and leaves no residues", continued Dr. Woodruff. "The housewife has

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OR
IN-BETWEEN

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Any job—for any temperature
80° below to 40° above

This assurance is backed by three generations of CP refrigeration know-how, advancement and *continuous user preference.* See Your CP Refrigeration Representative about your needs.

CP Type "K" Booster Compressors 4, 6 and 10 cyl. models, cap.* from 10 to 120 tons.

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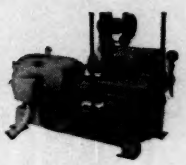

CP Type "K" Ammonia Compressors 4 and 6 cyl. models, cap.* from 10 to 200 tons.

*Depending on suction pressure.

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may we explain that this product is a tempering ingredient that comes in the form of a little green tablet. Two or three TEMPLETS dissolved in a can will improve the quality of the ice and leave no taste, no odor, and no color.

TEMPLETS make ice stronger, reduce its tendency to crack during cutting or scoring and help produce a clearer cake. White butts, heavy cores and that cloudy veil that sometimes prevail can be completely or partially eliminated. TEMPLETS help clear ice of imperfections caused by raw hard water.

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TEMPLETS can be used at a cost of only about one cent per ton of ice.

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learned many of these advantages. The medical profession has not only learned the advantages of refrigerated storage, but is using it in the operating room.

"Farmers are using it to eliminate peaks and valleys in production and marketing. For example, pecans, peanuts and other products which were formerly short season item are now marketed on a year-round basis."

Dr. Woodruff said that the entire food industry should be sold on the advantages of refrigeration. He went on to point out how canned goods retain color, aroma and flavor much longer under refrigeration than at normal temperatures. "For example", he said, "pork and beans stored at 32°F maintain their quality for five years, whereas when stored at 70°F they start to deteriorate in less than two years."

In conclusion, Dr. Woodruff said that perhaps the refrigeration industry is over-telling the negative side of frozen foods while underselling the positive side. "There is a lot of talk", he said, "about the time and temperature effects causing frozen peaches to brown, but seldom do we hear anyone stress the fact that they retain all their vitamins, flavor and aroma."

During this portion of the program, the effectiveness of refrigeration as a means of insect control, was also mentioned.

In sessions devoted to the "forward look" in the refrigerated warehousing industry, many ideas were advanced as to what trends the business is taking in meeting the changing conditions of today's requirements.

Demand For Service

"Join the evolution and move with it, —moreover, a moving target is less vulnerable in this conquest of space", urged W. B. Clements, Seabrook Farms Co., Seabrook, N. J., in pointing out the rapidity of changes occurring in the frozen food field.

"The packer and distributor is no longer just a buyer of space" said the speaker. "He is becoming a buyer of space and services—and very often the services determine where he will buy his space. Unless his idea strikes home the space problems of the 'astronauts' will be minor compared to yours."

Further pointing out the necessity for diversification, he offered the following points for consideration: (1) Packers need in-transit points for shipment of their inventories around the country. (2) Do what you can to help the packer and distributor move their goods at the lower T/L rates. (3) Do you offer the distributors in your area a trucking service? (4) Are you beating the drum for frozen foods? (5) Have you ever made a survey in your area to see what footage of cabinet space is given to frozen foods? (6) Are you willing to tie up some of your money in loans to the packer against inventory stored in your own or other warehouses?

Frozen "Spoon Bread" Distribution

Richmond Cold Storage Co., Richmond, Va., acquired a small food processing operation for the freezing of "Spoon Bread" and the operation was moved into a seldom-used room in the plant, reported Virgil Weekley, where kitchen facilities and a built-in

freezer room have been provided. The operation, reported Mr. Weekley, "has been quite an education for us. The problems of marketing and transportation have certainly made us even more aware of the needs of our warehouse customers."

Leased Refrigeration Services

"We are looking at the cold storage business today in a much different light than we did three years ago", said Harry M. Spradling, Carthage Ice & Cold Storage Co., Carthage, Mo. In diversifying its operation, the company has installed pipe line refrigeration; are leasing a Liquid-Freeze operation to a poultry plant in the interest of better customer-relations, and have entered into the Institutional Distribution business, purchasing a small distributorship, working with local chains on a warehousing and store-door delivery basis.

LTL Service

The warehouseman should offer as one of his services, LTL delivery service through the use of ICC regulated refrigerated common carriers operating from his city, said C. A. Martin, Polar Refrigerated Services, Nashville, Tenn. The frozen food industry in demanding this service and, the speaker pointed out the difficulties involved in setting up this service in securing a sound certified common carrier with proper refrigerated trailers capable of product delivery at 0°F. when ambient temperatures are above 100°F.

Distribution Business Analysis

Getting into the Frozen Food Distribution Business requires careful analysis of evaluation of the local market, stated George F. Hilgemeier Jr., of South Side Cold Storage Co., Indianapolis, Ind. Such an analysis should include primarily (1) potentials of various customers; (2) the competition; (3) frozen food brands. The company breaks down their customers in four categories; chains, independent supers, co-ops. and institutions. Three essentials are necessary to get into the business—proper financing—competitive pricing—adequate service. Mr. Hilgemeier's company started in 1941 with 28 items and now inventories in excess of 700, divided into 370 retail items; approximately 250 institutional items; 65 cooler items and 20 dry items. In the speaker's opinion, a distribution business would require, as a start, 300 items representing an approximate inventory investment of $100,000.00 Refrigerated delivery trucks represent a large additional investment.

In the progress report on "Storing of Nursery Stock" Dr. E. P. Christopher, Rhode Island Experimental Station, discussed the storage treatment and cutting dates of Christmas trees, indicating that trees could be cut as early as November 5 and stored successfully at 20-26°F.

At the conclusion of their convention, the NARW men elected A. R. Carstensen, Crystal Ice & Cold Storage Co., Sacramento, Calif., as president, succeeding W. C. Baker of Chicago.

Other new NARW officers are: Vice-president, Garth A. Shoemaker, Hygeia Refrigerating Co., Elmira, N. Y.; Treasurer, William L. Baker, Seattle Ice & Cold Storage Co., Seattle, Washington.

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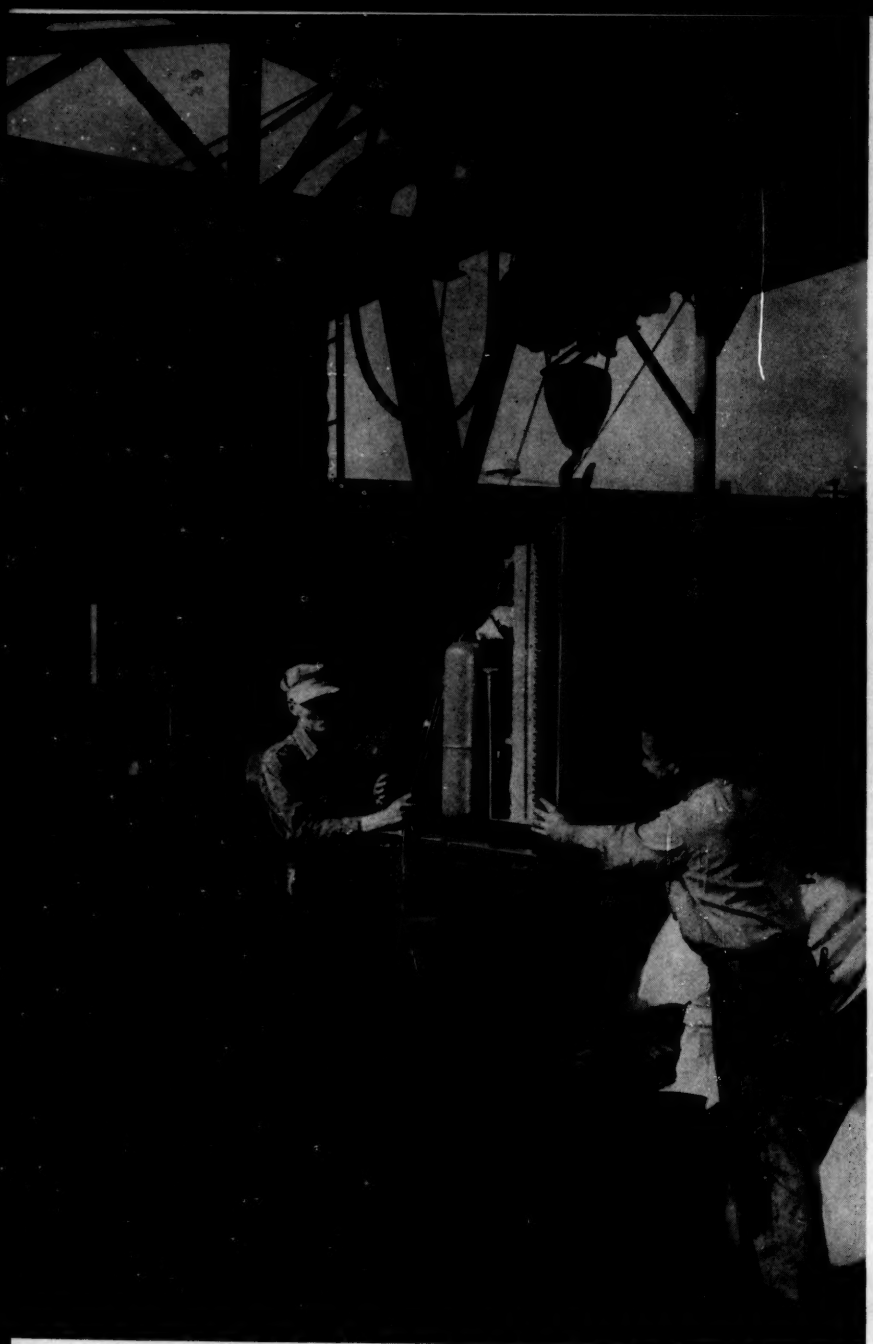
Temperature Railroad



Secondary cooling system permits quick installation or removal of self-contained refrigerating units. No high pressure primary refrigerant lines need breaking. Only necessary to unplug electrical connection and disengage two quick-disconnect flexible hose which carry secondary coolant.

»» THE development of dependable mechanical refrigeration cars for the nation's railroads has had as one of its major hurdles the development of temperature control instruments accurate enough to maintain the precise temperatures required and still hold up under the hard knocks of railroad operations.

Industrial control engineers, working with the development engineers, refrigeration compressor manufacturers, reefer car builders, railroads and operators have evolved lines of hybrid temperature controls which not only are meeting the special railroad requirements for precise temperature control, but the extra-special requirements for sturdiness and long-term serviceability.

Temperature control for cars used in frozen food transport is a specially complex problem. The low temperature cars, operating usually at minus 10 to zero F, usually involve the use of two stages of refrigeration, plus a heating circuit.

On initial pulldown from ambient temperatures, the temperature control calls for both refrigerating compressors to be in operation. As the temperature is pulled down to the control set point, one compressor is deactivated by the control. If the remaining compressor continues to pull the temperature down below the control set point (as would be the case if the outside ambient temperature were low), the second compressor is turned off. If the temperature continues to fall below the set point, the control automatically actuates the heating circuit.

In a road condition where the reefer car is traveling through desert-like climates and the control requirements are at zero, the heating cycle will most likely never be used. The heating cycle is not used in refrigeration control but actual heating is used for automatic defrosting. But, if this same car travels through sub-zero temperatures, as would often be encountered in mountainous country, the temperature control would be likely to utilize the heating cycle alternately with one of the refrigeration cycles in order to maintain the preselected load temperature.

For cars used in perishable commodity transport using the higher range of refrigeration only, (32 to 70 degrees) a control has been developed to operate with a system closely akin to the heat pump or reverse cycle system. The system utilizes a single compressor which provides both heat and refrigeration through the use of a three-way valve which simply reverses the flow of refrigerant to alternate the

Control In Refrigeration

By WAYNE A. McGREW, vice president
Partlow Corporation, New Hartford, New York

function of the evaporator and the condenser. Under this system the compressor operates at a constant speed without cycling. The control incorporates a single switch which controls the position of the three-way valve providing heat or refrigeration as called for by the mercury sensing bulb.

One of the important early problems encountered with temperature control by the railroads and their suppliers was the ever present road shock and vibration problem. This factor has automatically almost eliminated the use of many temperature control instruments effectively used in stationary industrial and commercial applications, requiring the same accuracy and sensitivity.

Delicate bi-metallic, bellows or

Refrigeraiton unit, left, and diesel generator, right, which makes up the cooling and heating power equipment for railroad freight cars. Diesel runs continuously —supplies 220 volt current for compressor, fans, pumps and heating elements.

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*Two years ago the Z.R.C. coated beam over this dairy's loading platform was scratched by a high van. Note in "close up" how Z.R.C.'s galvanic protection has kept the exposed metal virtually rust free. Even where rust has formed IT CANNOT SPREAD but will remain confined to the scratched area.

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WAKEFIELD, MASS.

electronic type temperature instruments commonly found in stationary applications have been found generally to lack the power required to positively actuate the switches in reefer-car applications and to resist the road vibration and shock encountered by these cars in road service.

Railroad and many truck refrigeration men have for the most part standardized on the filled system which operates on the principle of differential of expansion between a medium enclosed in a sensing bulb and the bulb and capillary metal. The medium used is usually mercury. In reefer-car application, the mercury-filled bulb is suspended in the cargo space in a location which assures that it receives the greatest possible amount of air circulation. The medium in the bulb expands or contracts in direct proportion to the heating or cooling of the air in the cargo space. This action is transmitted through a capillary tube which runs through the wall of the cargo space to the instrument itself and works directly against the flexible diaphragm. The diaphragm movement, in turn, exerts a pressure against levers which actuate whatever switches are necessary in the system.

The pressure exerted by the mercury-filled system is extremely powerful as it is derived from the fact that mercury is virtually incompressible. The internal pressures of a mercury bulb are as high as 300 psi. This positive pressure exerted against the diaphragm permits the direct operating of levers without added electronic or other outside amplification. The levers and linkages are not required to be delicate in this system.

Simplicity of a filled system has been found to be a major advantage for railroad reefer use. Service problems with a mechanical system of this type is minimum as compared with industrial control systems involving electronic circuits.

Filled system controls have an added feature important to railroad application, the easy field replacement and interchangeability of thermal sensing elements. In order to replace a thermal element, it is only necessary to remove two screws and a flange holding the element to the instrument body. A replacement element may be quickly submitted. The instrument is then re-zeroed by using a checking thermometer whose bulb is attached directly to the new bulb of the control instrument. Switch replacement by semi-technical railroad servicemen is also possible.

Railroad reefer controls are available in indicating and non-indicating types. The incorporation of an indicating dial has as its principal advantage the fact that no additional checking instrument is necessary in order to monitor the function of the control. The setting pointer utilizes the same scale as the indicating pointer.

Reefer control engineers are also looking to the future possibility of using recording controllers . . . . a trend which seems to be on the increase in the trucking industry. The possibilities inherent in a chart record of minute-by-minute in-transit load temperatures are obvious, and this feature is expected to be an important part of the reefer controls of the future.

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New Products Designed to Improve Operation

Large Hermetic Motors Have New Built-In Overload Protection

A NEW kind of overload protection for hermetic motors used in large air conditioning systems has been announced by General Electric.

The simple, fast-acting Thermo-Tector protection system is available on all the company's hermetic three-phase induction motors, 30 to 250 horsepower.

The protection is provided by two or more miniature heat-sensing switches buried in the stator windings.

The switches, connected in series with conventional motor control, shut the motor off whenever internal winding temperature exceeds a predetermined amount regardless of rate of temperature rise.

Under rapid rise the Thermo-Tector switches "anticipate" and open the circuit at a lower temperature than when the rate of rise is slow. The Thermo-Tector system uses only two additional wires; there are no amplifying relays or fancy circuitry.

The switches are small enough to be buried in the stator windings where the motor heat is generated, but they are rugged enough to handle size 4 contactor coil current.

Hermetic motors with Thermo-Tector protection provide these advantages to the air conditioning system designer and user, G. E. engineers said:

1. Burnouts from overload—with the resulting high repair costs and customers complaints—are virtually eliminated. The heat-sensing switches "keep a finger on the motor pulse" under the coil insulation. Their action is not affected by varying ambients nor is it delayed by heat flow through insulation or structural metal.

2. Compressor manufacturers can match the hermetic drive motor more closely to the load, since there is no need for a higher power rating as a safety margin. Precise matching of motor and compressor is a cardinal aim of General Electric's "Econo-Match" engineering service for air conditioning manufacturers.

3. No expensive control devices, relays, or amplifying circuits are needed. The buried snap-action switches carry the full contactor coil current and are connected with conventional controls in the same way that thermal overload relays are connected to the motor starter.

4. The Thermo-Tector system is "fail safe." Any break in wires, switches, or connections acts to stop the motor.

5. The Thermo-Tector system's speed of action protects the hermetic motor even against sudden overloads due to single-phasing or stalling.

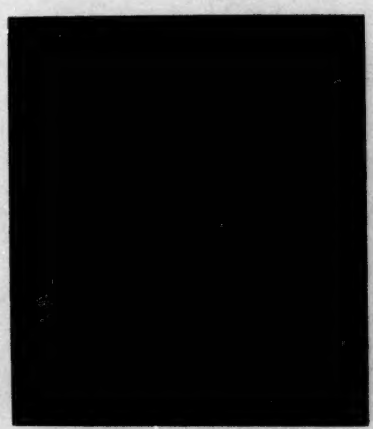
Downtime after tripout is limited to finding and correcting the cause of the overload, something that would have to be done anyway.

Vacuum Gauge

BATTERY-OPERATED, transistorized vacuum gauges with ranges of 0 to 1000 microns of mercury or 0-20 millimeters of mercury, are now available from Hastings-Raydist, Inc. of Hampton, Virginia. Portable or panel-mounted models are available in either range.

Features include high accuracy; rapid response; direct reading; matched, interchangeable gauge tubes; ruggedized, sealed meter and spring-loaded on-off switch.

These gauges provide continuous, practically instantaneous measurement of the pressure of a gas under vacuum. All models have an accurate ruggedized, sealed, electrical indicating meter which is calibrated directly in terms of pressure. Continuous readings may be made without affecting the pressure in the system. All models also include a spring-loaded On-Off switch to prevent battery drain when the instrument is not in use.



The rugged gauge tubes afford freedom from outgassing, system contamination and corrosion. They connect to the vacuum system by means of a standard 1/8" npt male pipe thread. Availability of matched and interchangeable gauge tubes allows the user to monitor at multiple gauge tube locations with one indicator, without recalibration or resetting of the instrument.

Combination Balancing And Shut-Off Valve

A NEW combination balancing and shut-off valve with a built-in "memory" has been introduced by American Air Filter Company. The new Illinois valve takes the place of two valves normally used in series on the return line of a water coil and competes favorably with the price of the two valves it replaces.

Economies also are affected in the installations with only one valve to be installed instead of two.

Adaptable to almost any heating and cooling water application the new Illinois balancing and shut-off valve enjoys extremely efficient balancing characteristics. A unique feature, known as the 'memory', allows the balance position to be fixed and permits the valve to be closed and opened to the pre-determined balance point—but no further.

Differing from most balancing valves, the Illinois valve can be shut off absolutely tight while also performing the balancing function, thereby eliminating the need for a gate valve in series.

Constructed of carefully machined brass, the valve is available in four sizes—1/2", 3/4", 1" and 1-1/4", and four straightway patterns. Offering very low resistance, the new valve has a pressure range of from 0 to 125 psig.

It is particularly suitable to applications involving cooling tower circuits with multiple condensers, air handling units, finned radiation, convectors, unit heaters, zone units, etc.

Three-Stage Package For Low Temperature Requirements

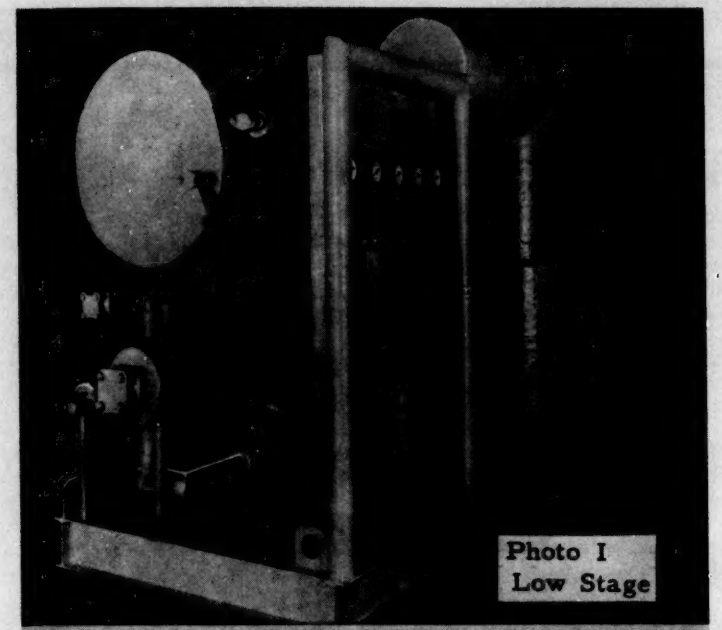


Photo 1
Low Stage

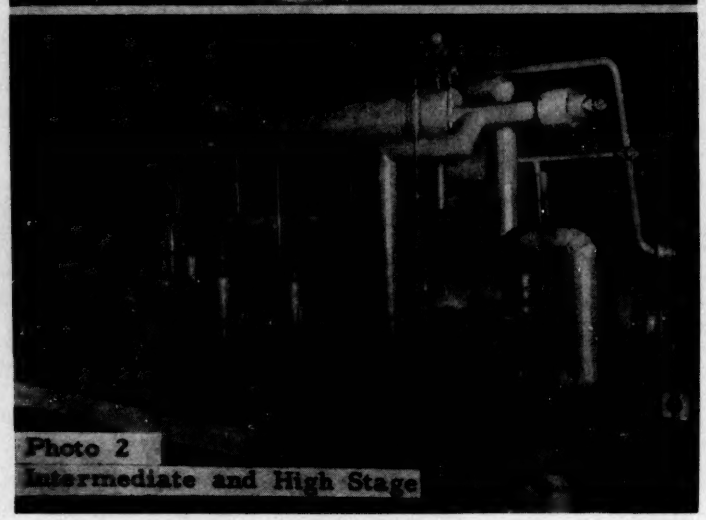


Photo 2
Intermediate and High Stage

THE development of a three-stage rotary booster package, including an insulated cooler which produces -92°F methanol, is announced by Freezing Equipment Sales, Inc.

Typical applications of the new package unit would include frozen food distribution warehouses, field station ice cream hardening rooms, low temperature test chambers, and brine cooling for dairy, drug, chemical and petrochemical industries.

Designed for use with Refrigerant-12, the unit is factory-assembled in two sections, each 5 ft., 6 in. wide and 15 ft. long, thus simplifying field installation. Prototype is now in use providing low temperature refrigeration for missile head testing.

One of the two structural sections consists of intermediate stage FES-Fuller Rotary Booster driven by a 40 hp motor and a high stage reciprocating compressor, also driven by 40 hp motor (see photo 1). This section further includes water-cooled condenser refrigerant gas and liquid intercooler, automatic oil return system and interconnecting piping assembled, tested and insulated before shipment.

The other structural section includes a low stage, 40 hp, FES-Fuller Rotary Booster, methanol cooler with refrigerant level controller, automatic oil return system, low-stage refrigerant gas and liquid cooler, with interconnecting piping assembled (see photo 2), tested and insulated before shipment.

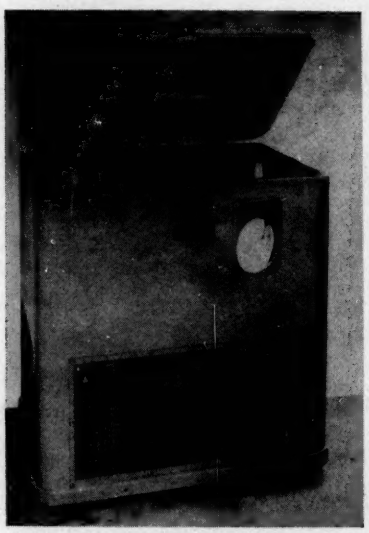
In the field-tested prototype, both structural sections were shipped by truck to the job site. They were then hoisted through the unfinished roof and placed on simple foundations on the floor. Interconnection of the two sections required only removal of flanges and completion of five lines handling refrigerant gas, liquid and lubricating oil.

A factory-assembled electrical control panel is mounted on the three-stage package. After the electrical power supply was connected to the control panel, the system was evacuated, tested for leaks, charged with refrigerant and immediately put into operation.

Freezing Equipment Sales officials report that the company now tailor designs packages of any tonnage and horsepower to meet individual requirements for industrial use.

Sub Zero Equipment

CINCINNATI Sub Zero Products, manufacturers of ultra low temperature equipment for over twenty years, announce a multipurpose model A-120-5. This new model is equally adaptable to metallurgical applications or special test requirements. For production chilling, a convection fluid can be used in the chamber to facilitate chilling of small parts. When special tests are necessary, an air circulator in the lid provides mechanical air convection to minimize temperature variation and maintain close temperature control. Operating range is provided from plus 70°F to -130°F.



Exterior dimensions are 40″ long x 32″ wide x 44″ high. Chamber dimensions are 30″ long x 18″ wide x 16″ deep. All-steel unitized construction; exterior finish Grey Lacquer.

Completely portable; mounted on four swivel casters. Operation is for 230-60-1 electric service.

A cascade refrigeration system provides maximum operating efficiency at nominal cost. Meets many plant requirements, and can be disconnected from service for use in various plant areas without loss of refrigerant. A wide range of applications are possible with the accessory features which include an 8" x 16" window; interior illumination; indicating-recording controller; air circulator. The lid is full-opening, and counterbalanced. Heaters can also be adapted to this model, if required, for high-temperature tests.

This multipurpose model is typical of the versatility of design which can be supplied in both production chilling and environmental test equipment manufactured by Cincinnati Sub Zero Products. Similar models have been supplied to users throughout the United States and Canada, as well as many foreign countries, for stabilization of steel, stress relief of aluminum, dehydration of gases, research, laboratory and medical use, storage of biological products, and other applications.

Single Control By-Pass Valve

A SINGLE control by-pass valve which eliminates intricate piping connections for induction and fan-coil air conditioning systems in which water is circulated has been designed by Clayton Mark & Company, Evanston, Ill., manufacturer of water well supplies, pumps, forged steel fittings, conduit, and electric weld tubing.

Saving space, materials, and labor, one compact casting combines the functions of inlet and outlet stop valves and the by-pass or flushing valve which normally are installed at each coil in a central air conditioning system. One 90-degree turn of the control handle on the new valve opens the by-pass and shuts off the water supply to the coil and thermostatic control.

The new valve is designed to replace the three-unit valve cluster which normally is installed at each coil so that pipelines can be flushed prior to putting the system in operation. With a large office building or hotel requiring the setting of hundreds of by-passes when pipes are to be flushed, the new valve's labor-saving advantage will multiply rapidly. It also provides convenience when an individual unit in the air conditioning system must be turned off for repair or maintenance.

Designed by Clayton Mark engineers in consultation with major manufacturers of air conditioning systems and thermostatic controls, the new valve is only one fourth the size of a conventional valve cluster and as-

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. . . with a LINK-BELT ice crusher-slinger

1500 LBS. OF CRUSHED ICE PER MINUTE! Here's an easy low-cost way to get your share of the large dollar volume spent each year for top-icing of perishables. At a rate of 45 tph, Link-Belt Series 500 ice crusher-slingers reduce 300 lb. cakes to a mixture of small to fine ice . . . *propel it through a flexible hose in a high-velocity jet.*

Features include: *INCLINED LOADING RAMP AND CHAIN FEED CONVEYOR* for positive delivery of ice cakes to crusher; *RUGGED ENCLOSED CRUSHER DRUM* with extra-large, hardened-steel, removable picks; *SWIVEL-HEAD SLINGER SPOUT* which permits delivery of crushed ice to either side of the machine.

Stationary and portable types . . . with gasoline or electric motors.

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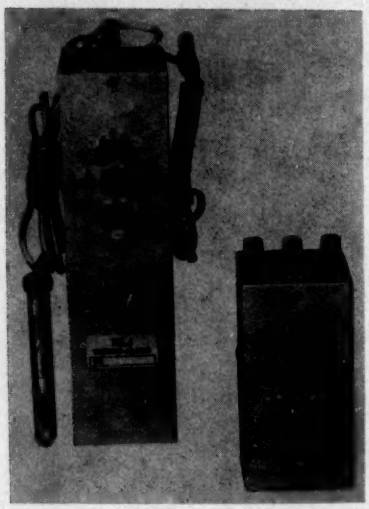
sembly. It measures 2-1/16 by 2-5/16 inches and requires only 14 cubic inches of space.

The No. 1831 by-pass valve is available in sizes to accommodate 1/2 or 5/8 inch O.D. copper tubing with either soldered or flare type connections. It is available through air conditioning, heating and ventilating, plumbing and hardware distributors and other trade outlets.

Temperature Alarm



A SELF-CONTAINED, easily installed electric alarm system with auxiliary battery power, available from Mack Electric Devices, Inc., Wyncote, Pa., uses a factory-preset, tamperproof mercurial thermostat as the sensing element and gives audible and visible warning of unsafe temperature in refrigerators, freezers, blood banks, sterilizers, brooders, laboratories, incubators, vaults, nurseries and other applications where temperature maintenance is critical. The unit plugs into any 115 v/ac circuit and mounts with a single screw and its use can save thousands of dollars in valuables through prompt, early warning. A green light shows safe temperature; an audible signal and amber light warn of unsafe high temperature and red light indicates unsafe low temperature. The warning buzzer can be silenced by flipping the toggle switch but warning light stays on until the condition is corrected. If electricity should fail, a dim amber light and audible signal warn immediately of power failure through the 6 volt battery. Battery effectiveness can be checked by a push button which simulates power failure.

New Solvent

A CHLORINATED cold-cleaning solvent that can be used repeatedly through reclamation in standard distillation units is announced by The Dow Chemical Company.

According to Dow, Chlorothene NU solvent is an appreciably improved version of Chlorothene. The company said Chlorothene has gained widespread acceptance as one of the least toxic and least expensive of all common chlorinated solvents.

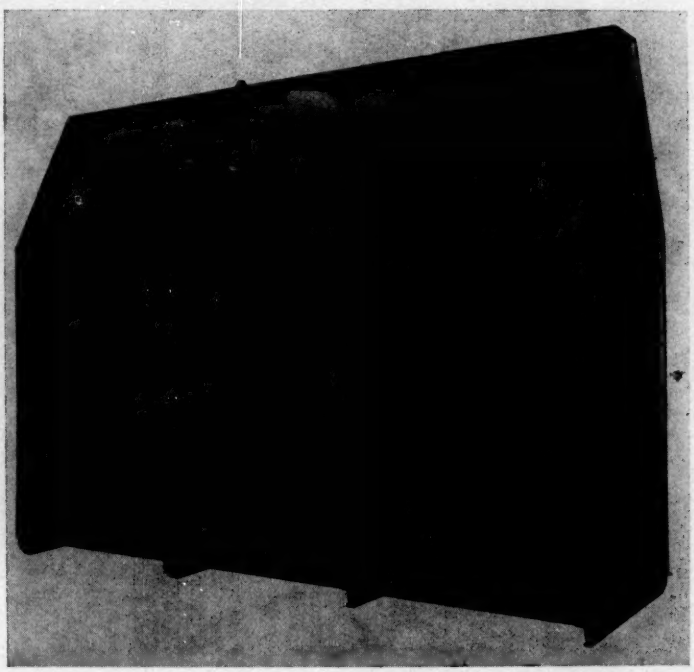
The greater resistance of Chlorothene NU to decomposition now makes repeated reclamation easier without need of either stainless steel or Heresite-lined equipment. This money-saving feature, Dow noted, drastically increases for large users the solvent's desirability in industrial cold cleaning.

Dow said the recoverability of Chlorothene NU puts it on a comparable cost basis with common flammable solvents.

The manufacturer said Chlorothene NU quickly and thoroughly removes greases, oils, tars, waxes and other lubricating compounds often found on metal parts, electrical equipment, certain plastics and other materials. Its advantages include ease of use—by the the dip, bucket, spray and wipe methods—greater safety, law corrosion and the fact that it leaves little or no residue.

Stressing the safety features of Chlorothene NU, Dow introduced the solvent at the Western Safety Congress in Los Angeles. It will be marketed in green and white color-coded drums so that it can be quickly distinguished from solvents with other characteristics.

Cooling Tower



THREE new models have been added to the line of AquaCoolers manufactured by The Marley Company of Kansas City, Mo., extending the number of models to 14 with a top nominal capacity of 90 tons.

These indoor cooling towers have undergone major redesign in the past six months. Marley claims for them increased installation adaptability due to interchangeability of casing panels, selectability of air intake and air discharge direction and multiple choice of hot water inlet and suction connection locations. Smaller models are designed to pass through standard 30-inch doorways without disassembly—larger models are designed for easy, quick disassembly if necessary.

All models feature quiet operating centrifugal blower type fans, balanced spray nozzle water distribution system and close packed filling for maximum air-water contact. Casings, basins, fans and fan scrolls are hot dip galvanized after fabrication for greatest resistance to rust and corrosion. Heavy duty mechanical equipment is designed and manufactured to provide long, trouble-free service.

DU PONT ANNOUNCES...

New "Zephyr" Containers for "Freon" Designed for Your Convenience

- Built-in carrying handle
- Can be used upright or inverted
- Can be stacked
- New handwheel valve
- Lighter in weight
- New 50 lb. size

These new "Zephyr" containers can be used either upright or inverted without special blocks or stands. A permanent collar protects the valve and serves as a built-in carrying handle. These are the only refrigerant containers that can be stacked one on top of the other. They are shorter—lighter—easier to carry. A 50 lb. size is now practical. No wrenches are needed because these new containers also have a new type handwheel valve. They will stand upright in your truck.

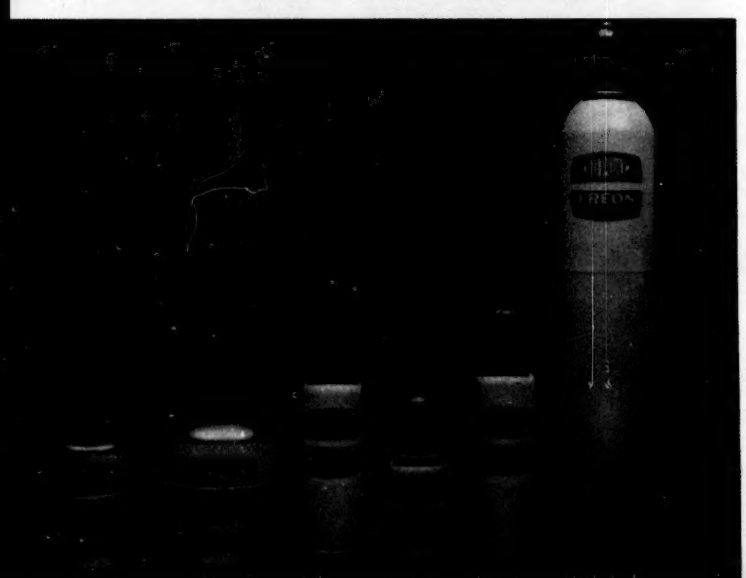
"Freon-12" and "Freon-22"—the premium quality refrigerants—are now available in these new "Zephyr" containers in 25 and 50 lb. sizes from your *leading* air conditioning and refrigeration wholesalers. Place your order for "Zephyr" containers today.

Please turn page for another announcement ▶

NEW TOP *and* VALVE

are being added for your convenience

to Standard 25 lb. cylinders for "Freon"



This new "Spintop" cylinder is now available in addition to the Standard 25 lb. cylinder with hood cap. The "Spintop" is a convenient carrying handle, valve protector and stand. Being free to rotate, it provides easy access to the valve. The regular valve has been replaced with a convenient handwheel type that includes a special spring-loaded pressure relief device for added safety.

Now—a Container for Every Use

For your convenience "Freon" refrigerants are offered in a family of containers*. Each of these types of containers has its own distinctive advantages. The container that best suits your needs is available from your leading air conditioning and refrigeration wholesaler. Call him today for your order of "Freon" refrigerants.

**1 or 2 lb. "Can-O-Gas" containers of "Freon" refrigerants are available from the Virginia Smelting Co., our nationwide sales agent and authorized repackager.*

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Predict Big Northern Market For Heat Pump

»» CHARLES V. Fenn, vice president of Carrier Corporation, recently predicted that widespread use of heat pumps in northern climates will be one of the significant developments in air conditioning during the next ten years.

Mr. Fenn said recent developments in office planning and in heat pumps make it both practical and economical for these versatile systems to use excess inside heat to warm entire buildings.

"It is no longer necessary to confine heat pump marketing efforts to mild climates where warmer outside air or well water provides a supplemental source of heat," Mr. Fenn said. "The wider use of modern, intense lighting and business machines, plus the fact that air conditioning permits more people to work comfortably in less space, have created new sources of heat. In fact, so much interior heat is generated it is often necessary to simultaneously cool inside areas while heating outer offices."

The Carrier executive said his company is building refrigeration equipment with 1,400 tons of cooling capacity for use with a heat pump installation in the new eight-story headquarters and research center of the Allen-Bradley Company in Milwaukee. This system is larger by nearly 500 tons than the previous record-size system built by Carrier last year for a publishing plant in Indiana. It also will be the northernmost installation of this type of equipment in the country, he said.

The new Carrier Balanced Heat Pump System will heat the entire building by extracting surplus heat from people, lights and business machines in interior areas and transferring it to cooler offices located on the outer parts of the building.

During warm weather the three centrifugal refrigerating machines to be provided by Carrier will be used to cool the entire building as part of the system designed by George H. Volk, Milwaukee consulting engineer. The architect is Fitzhugh Scott, also of Milwaukee.

In winter they will cool some parts of the building and heat others, simultaneously. In addition they will warm up two 75,000 gallon tanks of water for heating the building during weekends and at night when heat from people, lights and office machines is not available. No boilers or other fuel-heating devices are required.

Mr. Fenn said he anticipated much greater use of heat pumps in office buildings as installations like the present one demonstrate their practicality.

When the building is completed in 1961, it will house some 2,000 employees.

New External Newspaper Introduced By AAF

»» A NEW external newspaper has been published by American Air Filter Company, Inc. Designed for the architect, contractor, consulting engineer, building owner, plant maintenance official, school board administrator, etc., the four-page paper is to be distributed bi-monthly.

The initial issue was distributed to 17,000 persons nationally. Each issue will contain a "regional news" page and will feature product application stories and marketing news pertaining to that particular area—southern, eastern, pacific and midwest-central.

Purpose of the new publication is to provide product information and technical articles to AAF's customers and friends who have a particular interest in air filtration, dust control, and heating, ventilation and air conditioning problems and how to solve them.

Madden Brass Releases Two New Catalogs

»» MADDEN Brass Products Co., Aurora, Illinois, has just released two new catalogs that include the many new products added to the extensive Madden Line.

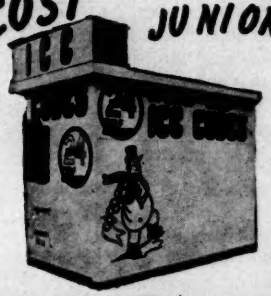
Industrial Catalog, No. 160, introduces the extensive new line of Madden general purpose valves for industry, and presents the wide range of other Madden industrial products; flare fittings, shut-off valves, drain cocks, tube working tools, brass pipe fittings and many others.

The new No. R460 Refrigeration and Air Conditioning Catalog lists the most complete line of flare tube fittings in the industry and, in addition to such items as hermetic port valves, color coded charging lines, driers, strainers, capillary tubing, automotive refrigerant dispensing kits, it also shows all of Madden's recently introduced products such as the new "tamper proof" tube piercing valves.

K. G. BROWN

HAS PERFECTED A

LOW-COST JUNIOR MODEL



NEW IN 1960

Now In Production!

Exhaustive research and engineering effort has produced this automatic ice vendor . . . incorporating many of the best features formerly found only in much larger stations. Measures 4x8 feet (outside) . . . vends 50, ten lb. bags, stores 100 more . . . "walk-in" rear door . . . ½ H.P. compressor . . . controls housed for easy access . . . recessed fluorescent lighting.

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K. G. BROWN MANUFACTURING CO., INC.
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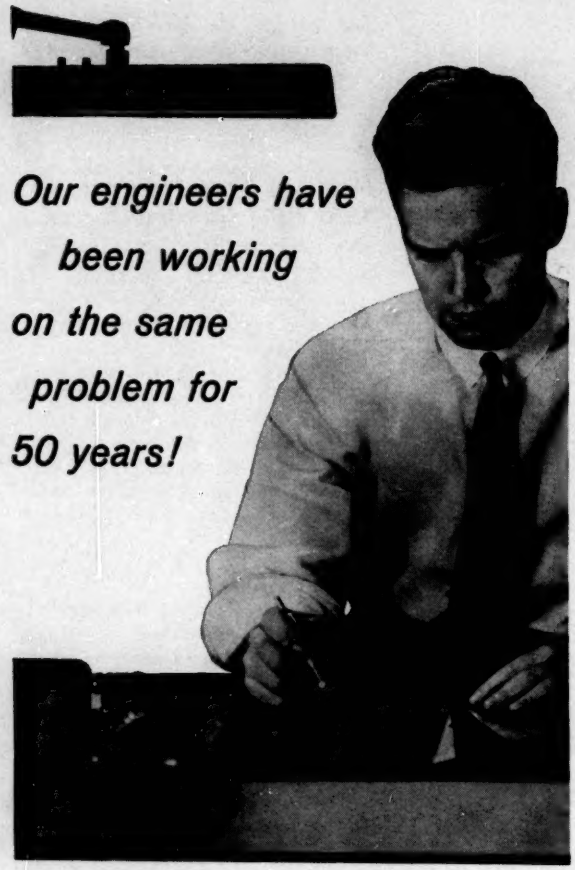


Dumb engineers? Not at all! At King Co. our engineers are taught never to be satisfied. No matter how *efficient* our last blast freezing plant, we go back to the drawing boards to try and make the next better. Maybe that's why we can proudly say: our engineers are the most highly experienced, best trained and most qualified creative people in the highly specialized freezing field.

King Co. has gained its know-how from the thousands of custom designed cold room installations—engineered, during the past half-century, for most of the nations leading companies.

Let our engineering department assist you in total planning—an exclusive King Co. service for operations in ice cream hardening, frozen food, refrigerated warehouses and blast freezing plants. Write today, we can place 50 years of problem solving experience at your disposal.

Write for free technical bulletin

King COMPANY OF OWATONNA
707 Cedar St OWATONNA, MINNESOTA

Heat Pump Orders Climb, Reports York

»»» "ORDERS for heat pumps received at York during the first quarter of 1960 were approximately double the volume of the first quarter of 1959," Henry M. Haase, President of the York Division of Borg-Warner Corporation, has announced.

"Our own sales records and those for the air conditioning industry in general show that the heat pump is accelerating in popularity more rapidly than any other segment of our dynamic business, with the exception of residential air conditioning.

"Greater strides were made in educating industrial users to the advantages and economies of heat pump operation during 1959 than in any two previous years. Consulting engineers and builders appear to be among the strongest champions of this combination heating and cooling equipment.

"In addition, many of the major electrical utilities recognize the load-leveling potential of widespread heat pump use and are actively promoting this highly efficient method of year-round air conditioning.

During the Fall of 1959 Haase told York personnel that the company would place greater emphasis on heat pumps, both packaged and built-up systems, during 1960 than at any time in preceding years.

"Typical of this use is a recent installation at a shopping center where 235 tons of packages were used. Approximately a third of the units were heat pumps. Because of a decided trend toward the use of packages, we are expanding the size of some units and will soon have available packaged heat pumps through 15 tons," Haase said.

York also has a wide range of compound air source "factory assembled" heat pumps with capacities from 50 to 150 tons of cooling. These units follow the packaged type of manufacture in that they are completely assembled at the factory, tested and shipped ready to connect and operate.

As for its field assembled or "engineered" systems, Haase said that "York has always been regarded as the pioneer in this field. We have installed more tonnage of industrial air source heat pumps than all the rest of the industry combined and orders for this equipment continue to increase in volume.

Squaw Valley Example

"There is no doubt that we will see great changes in both power generation and energy transfer to heating and cooling functions in the years ahead. Nothing currently available, however, has as much potential for economical year-round air-conditioning in so many applications as the heat pump.

"In the glamour and excitement of the recent Winter Olympics at Squaw Valley many people were unaware that another form of history was in the making. A York heat pump was providing the refrigeration for the first artificial ice in Olympic history and freezing the large expanse of man-made ice ever assembled at one spot.

"The quality of the ice was demonstrated by the records and outstanding performance of athletes in every skating event. There can be no doubt that the mechanical equipment use at Squaw Valley will have a great influence on the planning for future Olympics.

"Freezing ice was only a part of the work performed by the heat pump. Heat removed from the ice and from the winter air was also used to warm spectator areas in the big arena, heat domestic water and melt up

to 10 feet of snow from the arena roof each month.

"Squaw Valley is only one example of the invasion of cold climates by the heat pump. York installations can be found at a Sylvania laboratory near Buffalo, a Raytheon plant in Massachusetts, the Flick-Reedy factory north of Chicago and a motel in Minnesota, to name a few.

"Within just the past several years, the industrial heat pump has jumped the Mason-Dixon Line and demonstrated its applicability and reliability under a wide range of climatic conditions. I am quite sure we will see this pattern continue to develop on an even broader basis in the years ahead."

ASHRAE To Install New Officers, Directors

>>> NEW officers will be installed by the American Society of Heating, Refrigerating and Air-Conditioning Engineers when that professional engineering Society meets in Vancouver, B. C. June 13-15 for its 67th Annual Meeting.

Under the Plan for Consolidation, by which ASHAE and ASRE became ASHRAE, Walter A. Grant will succeed D. D. Wile as president; R. H. Tull will become first vice president and John Everetts, Jr. will be second vice president. As official nominee it is likely that the next treasurer will be John E. Dube.

Walter A. Grant is vice president, director of engineering, Carrier Corporation, Syracuse, N. Y. R. H. Tull is manager, product engineering dept., Westinghouse Electric Corporation, Columbus, Ohio. John Everetts, Jr. is consulting engineer. C. S. Leopold, Inc., Philadelphia, Pa. John E. Dube is president, Alco Valve Company, St. Louis, Mo.

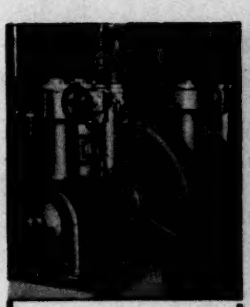
New members of the Board of Directors may be: W. J. Collins, Jr., consulting engineer, Oklahoma City, Okla., J. F. Naylor Jr., partner, J. F. Naylor & Company, Baton Rouge, La.; T. J. White, branch manager, American-Standard, Industrial Div., San Francisco, Calif., W. S. Harris, research professor, University of Illinois, Urbana, Ill;. W. L. McGrath, director of development, Carrier Corporation, Syracuse, N. Y.; J. W. May, director of technical training, American Air Filter Company, Louisville, Ky.; Axel Martin, professor of mechanical engineering, University of Michigan, Ann Arbor, Mich.; G. B. Rottman, consulting engineer, Greensboro, N. C.; and V. D. Wissmiller, manager of manufacturing sales, Minneapolis-Honeywell, Minneapolis, Minn.

1960 Hotel Exposition Has 650 Exhibitors

>>> THOMAS C. DEVEAU, chairman of the 45th edition of the National Hotel Exposition and vice president and general manager of the Park Sheraton Hotel, announced that the forthcoming Hotel Show will have a record breaking 645 exhibitors, the largest number of exhibitors of any trade show in America, of its kind.

The Hotel Show which is co-sponsored by the New York State Hotel Association, Inc. and the Hotel Association of New York City, Inc. serves the mass housing and mass feeding industries as a market place and educational medium. The Show will be held this year on November 14-17th in the New York City Coliseum where its more than 826 booths will fill completely the four huge display floors of that building.

As many as 60,000 owners, operators and key purchasing personnel from hotels, motels and allied industries that house and feed the public are expected to attend the Show this year.



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For every size load and application—5 to 150 tons

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VERSATILE
AS INDUSTRY
ITSELF!

HOWE Booster COMPRESSORS
For low temperature service

HOWE 3-Fan UNIT COOLERS
For heavy duty, high tonnage blast freezing, freezer storage

HOWE Polar Circle COILS
For freezer storage as well as normal temp work

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For highest "Degree-Dollar" refrigeration efficiency at the lowest possible cost, consult HOWE today. More than 48 years of specialized experience backs our recommendations.

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Since 1912, manufacturers of compressors, condensers, accumulators, unit coolers, surge drums, vessels, fin and pipe coils, flake ice makers, receivers, etc.

HOWE ICE MACHINE CO.

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Distributors in Principal Cities • Cable Address: HIMCO Chicago

New Yorks Shubert Alley Receives Chillers

»» AIR conditioning equipment capable of producing 650 tons of mechanical cooling disappeared beneath famed Shubert Alley in an historic move to "cool off" Broadway.

The lowering of the units into an abandoned boiler room beneath the alley represents the first step in the "largest single theatrical air conditioning installation ever devised".

Chilled water from the Worthington system will be piped from the central system to cooling units in the Shubert, Broadhurst, Majestic Booth, Royale, Golden, and Plymouth theatres which represent one quarter of New York's entire legitimate theatre district.

This historic installation replaces ice-chillng systems where up to $6,000 worth of ice per week, in 350 pound chunks, had been required to cool the seven theatres. The new mechanical system will cost one-tenth as much to operate, according to engineers, and will not only cool but regulate humidity and provide the other advantages of air conditioning.

Theatre owner John Shubert said "such a major project, in excess of $250,000 would have been a gamble a few years ago, but is a necessity today. In the past," he said, "virtually all theatres closed for the summer. As recently as 1950, summer operations accounted for less than 5% of our profits. Last year the figure was 40%. People didn't write in for tickets in the old days, but they do now." For instance Mr. Shubert said that six years ago his theatres booked about $100,000 in theatre party business while last year's figure was $5,200,000.

Air Conditioner For Missiles

»» An exceedingly compact air conditioner with the refrigeration capacity required to cool about 25 homes of average size is making Atlas missiles more reliable by maintaining low temperatures for heat-sensitive instruments and systems during checkouts, static firings, and countdowns which precede actual launchings. See front cover photo.

Developed by the Convair Astronautics Division of General Dynamics Corp., San Diego, Calif., it is a mobile unit with a height of eight feet, a length of 12 feet, and a weight of eight tons.

Its most important feature is a cycling operation during which air is initially cooled then heat expanded to remove moisture and recooled.

At a launch site, the conditioner is set up about 150 to 200 yards away from a missile to which it will convey chilled air through pipes with an internal series of perforated ducts.

In use, it cools 2280 cu. ft. of standard air per minute. The air leaves its coils at a temperature of 20°F., enters piping for a given missile at a speed of 600 m.p.h., and maintains temperatures averaging 35°F. in missile compartments.

Controls on a test conductor's console are used to activate the conditioner from a blockhouse during a countdown, and its piping connections to a missile are broken only a few seconds before launching is done.

Designed to operate on a self-sustaining basis, the conditioner has its own protection from the elements. Such protection includes louvered doors and removable panels which can be removed when necessary for maintenance purposes.

Electrical power and the aforementioned piping are the only external facilities required to put the new unit in operation.

Convair Astronautics officials claim they couldn't use available commercial air conditioners in cooling Atlas missiles because such units either lacked enough refrigeration capacity or else utilized water—a potentially dangerous element around missile components.

Eccentric Valve Bulletin

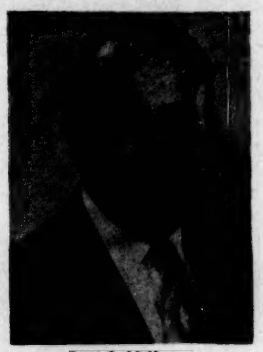
»» A NEW 8 page, 2-color bulletin is now available describing DeZurik Eccentric Valves. The bulletin lists features of the valve as well as materials, pressure ratings, dimensions, and accessories, and outlines the broad areas where the valve is extensively used. For a free copy, (contact the DeZurik representative in your area, or) write to DeZurik Corporation, Sartell, Minnesota, for Bulletin 110.

Portable Chlorinator Beats Contamination

»» MILTON Roy's Data Sheet D-60-1 describes the portable chlorinator used by a food processing plant to clear-up dangerous water contamination. With three ways to regulate dosages, the pump feeds a solution of sodium hypochlorite directly into the service on a 24-hour basis, maintaining a residual chlorine range of 0.2 ppm to 0.5 ppm. The short period of time required to place the equip-

ment into service and the simplicity of operation recommends portable chlorinating equipment for disinfecting new and repaired mains and services, and for stand-by use in times of disaster. Diagrams and photographs help explain the system.

Bert C. McKenna Dies



Bert C. McKenna

»» BERT C. McKenna, 51, Chicago, Past National President of the National Association of Practical Refrigerated Engineers died suddenly in his home April 24th of a heart attack. He is survived by his widow, Bruna, two sons and a daughter.

Mr. McKenna had served as president of both San Francisco and Chicago chapters prior to his election as National NAPRE President in 1957. At the time of his passing, he was Chief Engineer of Bresler Ice Cream Co., Chicago.

Mr. McKenna's refrigeration career started in 1927 as an apprentice at Golden State Co. Ltd., San Francisco, leaving that position to become an operator with Swift and Co. at South San Francisco. For a brief period he was engineer at the old St. Frances Ice Co. and then with Lucky Lager Brewing Co., San Francisco. In 1940, he returned to the Golden State Co. now a division of Foremost Dairies, Inc. in the capacity of construction superintendent in charge of erection of dairy plants and condenseries in northern California.

During the war years, he was assigned to engineering duties in the company's research division, supervising construction of pilot plants and new developments. In 1946, he was the supervising chief engineer for the northern division of the market, milk and ice cream departments for that firm.

He came to Chicago in 1952 as supervising chief engineer for the Central Cold Storage Co. and their four plants in the Chicago area, and later as supervising engineer of ice plant properties for the City Products Co.

Allied Appoints New Ammonia Agent

»» MILLER-STEPHENSON Chemical Company, Inc., of South Norwalk, Connecticut has been appointed agent by Allied Chemical Corporation, Nitrogen Division to handle Allied Chemical Anhydrous Ammonia in cylinders.

Stocks for the Connecticut area may be ordered from their office at 39 Day Street in South Norwalk.

DK Manufacturing Co. Purchases Dunbar-Kapple, Inc.

»» DK Manufacturing Company, Chicago, announced the purchase of all assets and assumption of liabilities of Dunbar-Kapple, Inc., Batavia, Ill. DK Manufacturing Company acquired the Batavia firm from General American Industries, Inc., New York City. The former General American subsidiary will be known as Dunbar-Kapple Division of DK Manufacturing Company.

Herbert N. Woodward is chairman of the board of DK Manufacturing Company, and Paul J. Firring is president. Both officials will retain their present positions.

DK Manufacturing Company is a prime manufacturer of Cobra metal hose for general industrial, refrigeration, air conditioning, and heating use, high pressure and high vacuum vessels and stainless steel ducting for the aircraft and missile industry.

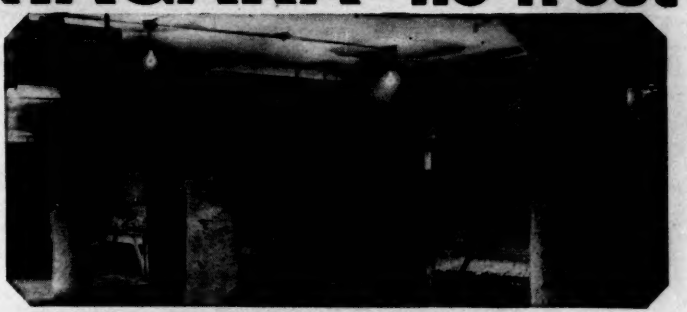
Dunbar-Kapple, Inc. manufactures pneumatic grain conveyors, aircraft and missile tubing and ducting, and boat trailers.

Pennsalt Isotron Sales Territories

»» E. SMEDLEY Ward, Jr. and Homer B. Greetham have been given new Isotron sales assignments by Pennsalt Chemicals Corporation. Announcement of the assignments was made by F. A. Lucard, manager, Isotron Chemicals Department.

Ward, a graduate of Dartmouth College with a B.A. degree in Chemistry and previously Isotron Sales Representative in Cleveland, has been assigned to the New York territory. Before joining Pennsalt in 1957, he was a sales representative for the Gulf Oil Corporation in Philadelphia. A veteran of World War II and the Korean War, he served as a U. S. Navy Commander with a unit which

NIAGARA "no frost"



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● Saving labor in both operation and upkeep, "No-Frost" fully automatic refrigeration gives you always the full rated capacity of your plant. You get all the benefits of continuous production and your business makes money on lower volume. Preventing all ice or frost accumulation, "No-Frost" prevents waste of power. You cut out much expensive maintenance labor in the cold room. Your production and your quality both improve because "No-Frost" pulls the product core temperature down the quickest and holds it uniformly.

Write for Bulletin No. 105

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Little Giant Model 90M

11 MODELS IN THIS LINE OF ICE BREAKERS FOR:

RESTAURANTS • HOTELS • AIR LINES
RAILROADS • LABORATORIES • TAVERNS
ICE PRODUCERS • PACKING HOUSES

The Little Giant Line has a long record of service to many types of users. These breakers are designed to break ice in rice to chestnut to 3" size and pea to chestnut to 4½" size. Hand and power operated. Write for details and prices.

LITTLE GIANT

DEPENDABLE ICE BREAKERS BY MICRON, INC., BETTENDORF, IOWA

received a Presidential Citation.

Greetham will be serving aerosol contract loaders, aerosol vendors, and original manufacturers of refrigeration equipment in a territory which includes Ohio, northern Kentucky, and lower Michigan.

He attended the University of Arizona. He served as a Technical Sergeant in the U. S. Army during World War II. Before joining Pennsalt's Isotron Department this year, he was employed in sales and product development for the Cleveland Electro Metals Co.

I. G. Grawoig Dies

››› I. G. GRAWOIG, 68, Chicago died in Los Angeles April 27. Mr. Grawoig was president of I. G. Grawoig and Associates, management consultants of Chicago and among his other interests was president of National Ice and Fuel Corporation.

Manufactured Ice Sales Increase in 1959

››› ANNUAL ice sales based on data furnished to the National Ice Association showed an increase in dollar value of 5.56 percent or $219,086,960 for 1959 as compared with $207,527,669 in 1958. This represented a production of 22,434,395 tons, up 1.97 percent from 1958.

The greatest increase reported was in ice cube sales which amounted to 851,776 tons, up 7.99 percent. Sized and crushed ice sales declined 1.65 percent to a total of 3,787,880 tons. Industrial and block ice sales of 17,794,739 tons was 2.49 percent better than 1958 and automatic vending outlets bettered 1958 sales by 6.13 percent, the fifth straight year this classification has increased.

Favorable weather conditions in the 1959 operating season helped sales both in tonnage and income.

Dean Panelcoil In New Bulletin

››› HERE is a new, easy-to-read technical explanation of how Dean Panelcoil can be used for heating or cooling both flat and curved surfaces. The illustrations are only typical of the types of Panelcoil variations in design that are available to fit your individual requirements. This economical heating and cooling panel is a modern replacement of old-style pipe coil and bulky, heavy integral jacketing. This information will be of interest to many of your readers.

If additional information is required on Bulletin M-10, or if you desire glossy prints to illustrate, we will be pleased to be of service.

Warehouse Directory Available For Users of Refrigerated Space

››› THE 1960 Directory of Public Refrigerated Warehouses published as a service for users of the facilities of such warehouses is available from the headquarters of the National Association of Refrigerated Warehouses, Tower Building, Washington 5, D. C. As indicated in the preface of the directory, it is a "desk book for the executive, sales manager, traffic manager and others interested in the storage of perishables."

The information covering the warehouses listed is complete in that in most cases the following information is provided; executive personnel, investment, type of warehouse construction, insurance rate, cubical contents of cooler and freezer space, refrigeration system, temperature range, humidity control, platform and rail facilities, bank references and other services offered by the warehouse.

Catalog Describes Industrial Insulating Materials

››› THE first catalog published since the merger of Baldwin-Hill Company with Ehret Magnesia Manufacturing Corp. to form Baldwin-Ehret-Hill, Inc., contains the full line of over thirty industrial insulations manufactured by the new corporation. Properties and specifications of the complete line of heat and cold insulations for service from sub-zero up to 1900 F are presented.

Spun mineral wool, calcium silicate, and 85% Magnesia products in block, blanket, felt, fill, cement, and pipe insulation forms are fully described and illustrated in the 24-page, two-color booklet. Thermal conductivities and tables of recommended thicknesses are given for each product for appropriate temperature ranges. Illustrated application instructions are also included.

A selection chart, which indicates the temperature range of all included types of material, is presented along with illustrations of typical installations in the chemical, power, commercial and other fields. In addition, an insulation specification guide identifies the products with appropriate Federal, A.S.T.M., U. S. Maritime Commission, and Military Specifications; and the U. S. Dept. of Commercial Standards.

The company's five plants and seven sales offices are also listed. While this catalog appears in Sweet's Industrial Construction File, Plant Engineering File and Architectural File, addi-

tional copies of the new catalog may be obtained from the Industrial Insulation Division, Baldwin-Ehret-Hill, Inc., 500 Breunig Avenue, Trenton 2, N. J.

Literature On Evaporative Condensers and Cooling Towers

»» A NEW 24-page bulletin 107, covers complete line of evaporative condensers from 10 to 700 tons in single, factory-assembled units. Engineering drawings, capacity and performance data, selection tables, and description are given for blow-thru, draw-thru, centrifugal-fan and tube-axial-fan models.

A new 28-page bulletin 207, covers complete line of fireproof cooling towers from 10 to 700 tons in single, factory-assembled units. Engineering drawings, capacity and performance data, selection tables, and description are given for blow-thru, draw-thru, centrifugal-fan, and tubeaxial-fan models. Both bulletins are available from Baltimore Aircoil Company, Inc., P. O. Box 7322, Baltimore 27, Maryland.

Centrifugal And Turbine Pumps Bulletin

»» FOUR page condensed bulletin illustrates and describes the Aurora Centrifugal and Apco Turbine Type Pumps . . . single and multiple stage . . . flexible and close coupled . . . horizontal and vertical. Includes brief description, features, typical applications, capacity and head range for each type of pump . . . turbine, non-clog, split case, sump, end suction and condensate return units. Salient design features include: vertical mountings for minimized space requirements, dynamic and hydraulic balance, Mono-vane single passage impellers for non-clog applications, and centerline discharge for self-venting. Capacities range from 1 to 9000 gpm. and heads to 600 feet. For further information write Aurora Pump Division, The New York Air Brake Company, Aurora, Illinois.

Catalog Describes Pressure And Temperature Recorders

»» CATALOG 800, a new 8-page catalog describing temperature and pressure recorders is announced by the U. S. Gauge Division of American Machine and Metals, Inc.

Spiral bourdon tube and bellows type pressure elements are pictured, with materials and performance characteristics listed.

Temperature elements described include the following types of actuation: mercury, vapor pressure, gas pressure and organic liquid. A table lists thermal element characteristics for each type.

Photographs highlight mechanical construction features including movement, pen arm, pens, chart drives, access plates and a bellows element in position in the recorder. Listing of optional construction features assists in specifying recorders for special applications.

Catalog also includes diagrams showing case dimensions, plus details of pressure and temperature connections.

Copies of Catalog 800 are available upon request from U. S. Gauge Division of American Machine and Metals, Inc., Sellersville, Penna.

New Literature From American Standard

A NEW 6-page 8-1/2 x 11 illustrated 2-color bulletin (No. 1928) describing the new Series 345 dust collector line is now available from American-Standard Industrial Division, Detroit 32, Michigan. The new bulletin outlines the advantages of large tubes for high efficiencies and resistance to plugging and utilizes a cutaway section illustration to explain operating characteristics. Design and construction principles are also discussed.

Highlight of Bulletin 1928 is a pair of easy-to-use nomograms, one for collector selection, the other for efficiency determination. Simple directions for using the nomograms are presented as related to an example problem. The recommended step-by-step procedure for collector selection and efficiency determination using the nomograms is given in terms of the example problem.

A new durable 3-ring Heat Exchanger catalog binder, containing 102 pages, comprising 13 separate 8-1/2 by 11 in. bulletins describing standard Ross shell and tube heat exchangers, is also available.

The bulletins included in the heat exchanger catalog binder have been specifically selected to meet the needs of engineers and purchasing agents responsible for selecting and specifying heat exchangers. Information covered in the binder is broken down into four categories: Coolers, Heaters, Heat Exchangers, and General Data.

Classified Advertising

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Advise Us Your Needs
Use QUICKSEAL—stops brine tank leaks.
Use CLERTEMPICE—clears and tempers ice.
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FOR SALE—200—11x22x63—400 pound size ice cans with grids; good condition, $3.00 each. Phone or write Lou Strongin, 810 Badgerow Building, Sioux City, Iowa, 5-8825.

FOR SALE—Frick 11½x10 ammonia compressor with Ideal synchronous motor; $1000 worth of new parts, guaranteed condition, immediate delivery. Address Box JU-5, c/o Industrial Refrigeration.

FOR SALE—York 7½x7½, 8x8, 9x9 with AC motors and starters; recently reconditioned, erected former Goebel Brewery, Muskegon, Mich., will sell separately at reasonable prices. Write for details. Jaco Equipment Corp., 3080 Main St., Buffalo 14, N. Y. Phone AMherst 2100.

FOR SALE
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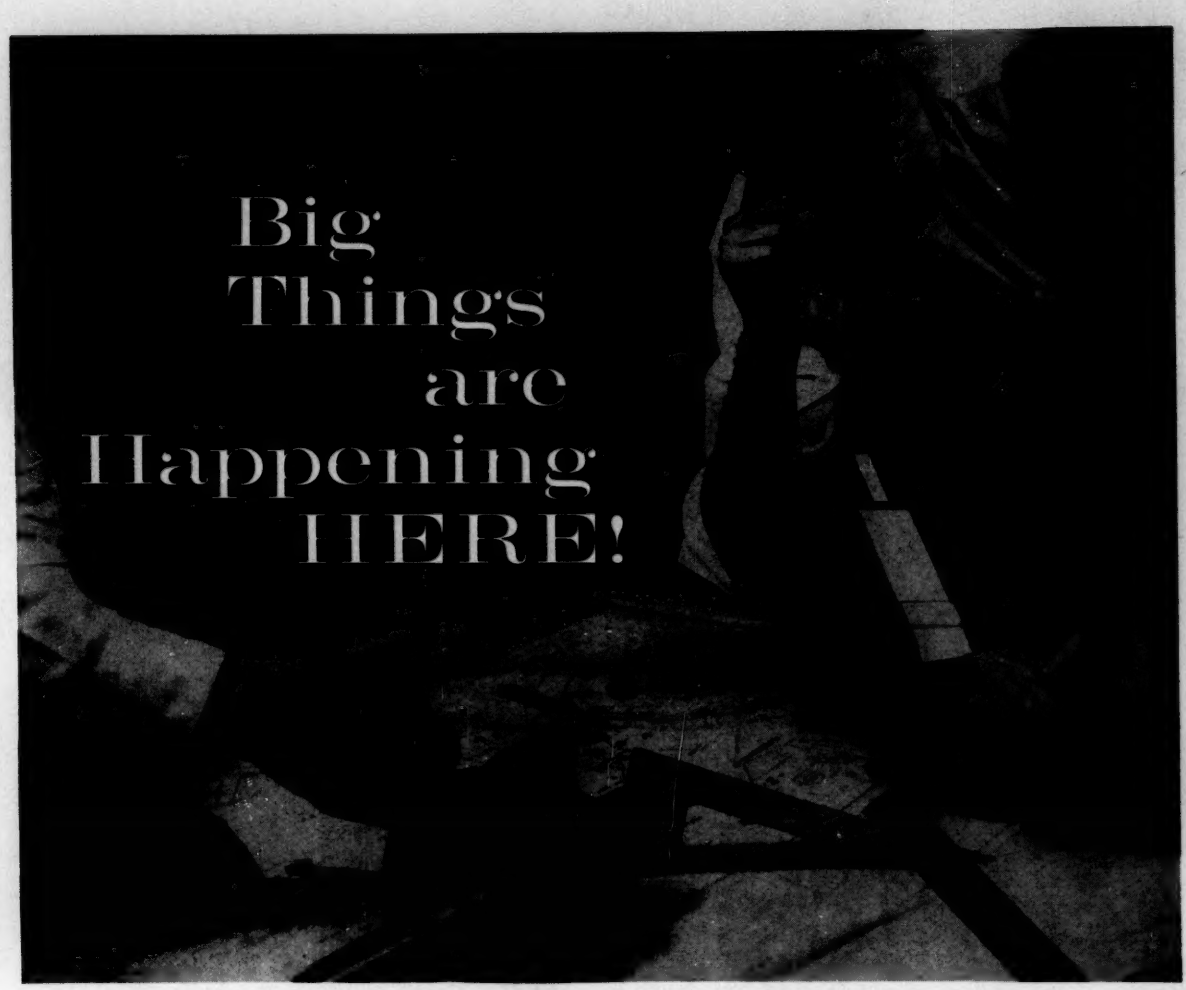

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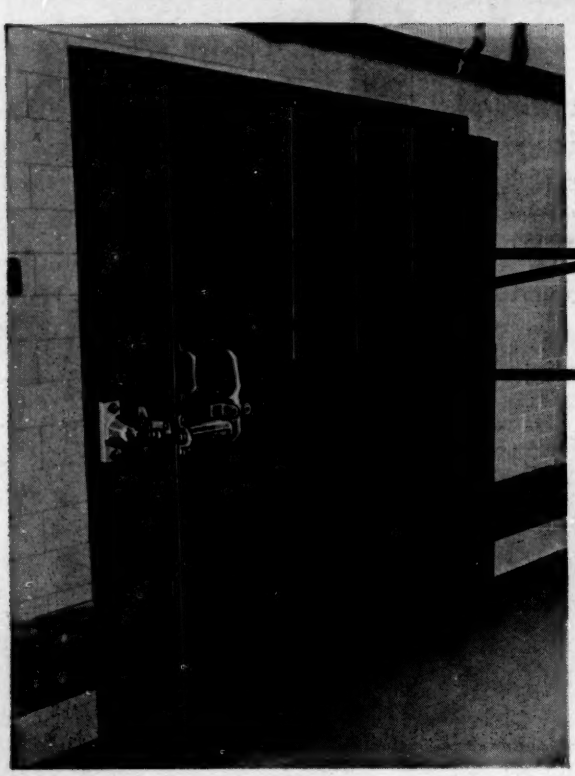

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